ARINC

NAVIGATION SYSTEM DATA BASE

ARINC SPECIFICATION 424-15

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Specification 424-5	October 10, 1984	March 18, 1985
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Specification 424-7	October 8, 1986	January 14, 1987
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Specification 424-13	May 23, 1995	December 31, 1995
Specification 424-14	August 24, 1999	February 11, 2000
Specification 424-15	January 12, 2000	February 11, 2000

A description of the changes introduced by each Supplement is included on goldenrod paper at the end of this document.

FOREWORD

Activities of AERONAUTICAL RADIO, INC. (ARINC)

and the

Purpose of ARINC Reports and Specifications

Aeronautical Radio, Inc., is a corporation in which the United States scheduled airlines are the principal stockholders. Other stockholders include a variety of other air transport companies, aircraft manufacturers and non-U.S. airlines.

Activities of ARINC include the operation of an extensive system of domestic and overseas aeronautical land radio stations, the fulfillment of systems requirements to accomplish ground and airborne compatibility, the allocation and assignment of frequencies to meet those needs, the coordination incident to standard airborne communications and electronics systems and the exchange of technical information. ARINC sponsors the Airlines Electronic Engineering Committee (AEEC), composed of airline technical personnel. The AEEC formulates standards for electronic equipment and systems for the airlines. The establishment of Equipment Characteristics is a principal function of this Committee.

It is desirable to reference certain general ARINC Specifications or Reports which are applicable to more than one type of equipment. These general Specifications or Reports may be considered as supplementary to the Equipment Characteristics in which they are referenced. They are intended to set forth the desires of the airlines pertaining to components and general design, construction and test criteria, in order to insure satisfactory operation and the necessary interchangeability in airline service. The release of a Specification or Equipment Characteristic should not be construed to obligate ARINC or any airline insofar as the purchase of any components or equipment is concerned.

An ARINC Report (Specification or Characteristic) has a twofold purpose which is:

(1) To indicate to the prospective manufacturers of airline electronic equipment the considered opinion of the airline technical people coordinated on an industry basis concerning requisites of new equipment, and

(2) To channel new equipment designs in a direction which can result in the maximum possible standardization of those physical and electrical characteristics which influence interchangeability of equipment without seriously hampering engineering initiative.

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1.0 INTRODUCTION

1.1 Purpose of this Document

This document sets forth the air transport industry's recommended standards for the preparation of airborne navigation system reference data tapes. The data on these tapes are intended for merging with airborne navigation computer operational software to produce tapes (or other suitable data stores) for use by such computers on board aircraft. Since the industry does not desire to standardize the operational software of these computers, this merging process is not described in this document, nor do the standards set forth necessarily apply to the aircraft-employed tapes.

1.1.1 Coverage of Flight Simulator Needs

c-4 Supplement 4 to this document added material related to the special navigation data base needs of flight simulators. The approach taken, i.e., the definition of three new subsections to the master file and the exploitation of previously unused continuation record capability, was designed to ensure that users who wish to continue using the document solely as the basis for supporting airborne navigation system operation can do so without simulator-related records nor be concerned that the software used to merge Specification 424 data with airborne equipment operational software will need modification as the result of the changes. Users who wish to support both airborne navigation system and flight simulator operations can also do so without having to modify this merging software. Only the simulator navigation data base compilers need take into account the presence of the simulator-related components in the input (Specification 424) data.

1.1.2 Coverage of Flight Planning Needs

c-9 Supplement 5 of this document added material related to the special navigation data base needs to flight planning computer systems. The approach taken, i.e., the definition of the new material and the exploitation of previously unused continuation record capability, was designed to ensure that users who wish to continue using the document solely as the basis for supporting airborne navigation system operations can do so without penalty. Such users need not obtain the flight planning related records nor be concerned that the software used to merge Specification 424 data with airborne equipment operational software will need modification as the result of the changes. Users who wish to support both airborne navigation system and flight planning system operations can also do so without having to modify this merging software. Only the flight planning navigation data base systems need to take into account the presence of the flight planning related components in the input (Specification 424) data.

1.2 Data Format Standardization Philosophy

The production of data tape cassettes for use with onboard navigation computers may be viewed as a four-step process. (See Attachment 1). The first step is the assembly of a data bank. The second is the production of data tapes organized such that individual airlines' operational needs can be met. The third step is the merging of these data with the operational software of those airlines' navigation computers. The final step is the production of tape cassettes containing these merged data for use on individual aircraft.

COMMENTARY

> It is recognized that airline navigation computers may use media other than tape cassettes for data storage. The term "cassette" is used in this document to exemplify all such storage media.

Data blanks will contain world-wide navigation reference information obtained both from "public" sources (ICAO, governments, etc.) and from navigation system users. They could be assembled and maintained by public bodies (e.g., government agencies or international organizations), by commercial institutions, or both. The information needed by an airline to make use of a navigation system over its own routes will consist of a section from the "public" part of the bank and the data it requires from the "user" part of the bank. It will occupy one of the "airline nav. data tapes" shown at the step 2 level in Attachment 1.

To facilitate the sorting process necessary to produce individual airline tapes, every record in the data bank is encoded as to type. Those in the "public" part of the bank are termed "standard" records, and may appear in any airline's tape. The "Master Airline User File" shown at the step 1 level in the diagram of Attachment 1 is made up of such records. They contain the data specified in Chapter 3 of this document, and are formatted according to the rules set forth in Chapters 4 and 5. Records in the "user" part of the bank are termed "tailored" records, and each one is entered into the bank to support the operations of the particular user (airline) that requires it. Chapter 4 of this document sets forth a standard format for encoding tailored route information, while Chapter 5 includes definitions of certain fields used exclusively for this purpose. c-1

Individual airline tapes are used in step 3 of the cassette production process. This may be performed either by the airline itself (as may step 4), or by an agency contracted to support the airline's navigation system operations, such as the airborne equipment manufacturer.

It can readily be seen that in the absence of air transport industry guidance, individual navigation system manufacturers could follow equipment design approaches that impose different requirements on the format of the navigation reference data. Although, as implied in paragraph 1.1 above, the airlines do not wish unnecessarily to constrain equipment design, the cost to them as an industry of supporting the production of tape files in several different formats would be prohibitively high. For this reason they have produced in this document data format and encoding standards to be applied in the production of these files. These standards are not intended to be used in the final two steps of cassette production, nor is any obligation imposed on anyone to make use of every data element defined. In this way manufacturers are free to optimize their hardware and software designs as they see fit, and reference data acquisition costs are minimized.

COMMENTARY

> In some cases in this document data fields are defined offering greater resolution than is usually available for the data in question from the source data bases. This is intended to reflect the airlines' desire for the use of the best available data. It is not, however, intended to suggest a need for special surveys in order to provide the data to the c-2

1.2 Data Format Standardization Philosophy (cont'd)

resolutions shown. Also, consideration of the application of the data base described in this document, with the aim of determining whether or not a standard earth model reference should be defined, produced the conclusion that such action was not necessary.

c-2

Readers should note that ARINC 424 Specification is not a data base specification per se. It is a standard for the preparation and transmission of data for assembly of airborne navigation system data bases.

1.3 Organization of this Document

A glossary of data processing and special navigation terms precedes the chapters of the document in which the recommended standards are defined. In the first of these chapters, the organization and content of the "master airlines user file" (see Attachment 1) is defined. The next chapter describes records in terms of their field structures. Following that, individual fields are defined in terms of the data elements from which they are constructed. Figure 1-1 pictorially relates these methods of information presentation to the layout of data on one of the individual airline tapes shown at the step 2 level in the diagram of Attachment 1. With the file structure definition complete, attention is turned to the encoding of data for computer processing.

1.3.1 Coverage of Helicopter Operation Needs

Supplement 14 of this document added material related to the special navigation database needs of rotorwing flight operations. The approach taken was to define as "dual use" as much of the database as possible, specifically the ground base navigation and landing aids. These records are defined as the Master Airline User File. Where dual use was not possible, new content was defined as the Master Helicopter Use File. The new content was all related directly to the heliport and flight operations into and out of heliports. It included helicopter
c-14 SIDs, STARs and Approach Procedures and Heliport Terminal Waypoint. Minor adjustments to the content of records that are dual usage were required, an example would be a new route type code for Enroute Airways dedicated to helicopter airways. All changes were made so as to have no impact on any other application of ARINC Specification 424, provided database suppliers avail themselves of the data selection capabilities built into that revision.

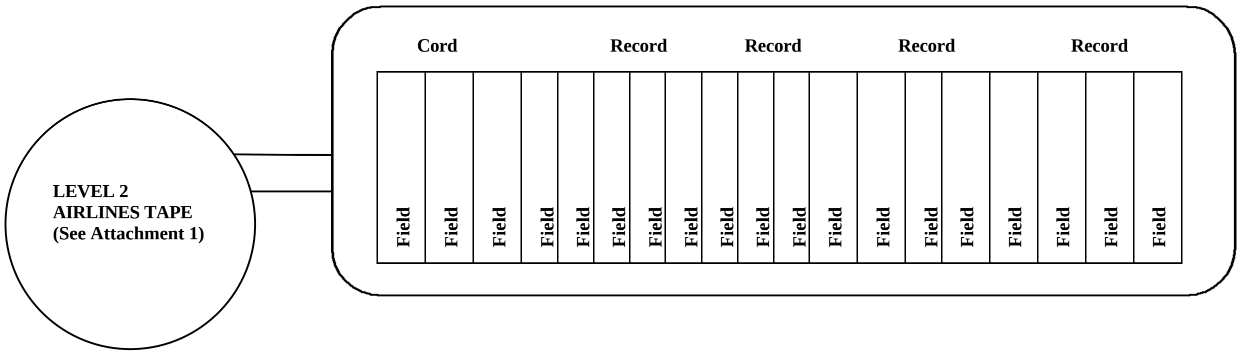
1.4 Reference Documentation

ARINC Characteristic 702, "Flight Management Computer System,"

c-15 ARINC Characteristic 702A, "Advanced Flight Management Computer System"

ARINC Characteristic 756, "GNSS Navigation and Landing Unit (GNLU)"

1.0 INTRODUCTION (cont'd)



CHAPTER 3 defines content and organization of the Master Airline User File (See Attachment 1)

CHAPTER 4 defines locations for fields in RECORDS

CHAPTER 5 describes FIELDS

CHAPTER 6 defines data ENCODING STANDARDS

Figure 1-1 ARINC Specification 424 Information Presentation

2.0 GLOSSARY OF TERMS

2.1 Data Processing Terms

This Section contains definitions for the data processing terms used in this document. They are listed alphabetically.

Alpha The terms employed to describe any letter of the alphabet.

Cassette A package for housing the data tape used in the flight data storage units of some airborne navigation systems.

Character The basic human-oriented data element, e.g., a single letter of the alphabet or a single number (0 through 9). The entry RW26L is said to consist of five characters.

Column The spaces for data entry on each record. One Column can accommodate one character.

Field The collection of characters needed to define one item of information. The entry RW26L identifies "runway 26 left" and is described as a five-character field.

Numeric The term employed to describe any single number in the range 0 through 9.

Record A single line of computer data made up of the fields necessary to define fully a single useful piece of data. A VORTAC station record, for example, contains fields for station name, coordinates, frequency, elevation, variation, ICAO code, ident code, plus certain administrative data pertaining to the record itself.

c-1 **Sub Section** A collection of records of functionally data items. Section The records for Approach routes form a subsection of the Airport data base.

Section The first division of the database. Each section is made up of subsections as defined above.

2.2 Special Navigation Terms

This section contains definitions of certain special navigation-related terms used in this Specification. They are list alphabetically.

ATC Compulsory Reporting Point Essential or non-essential waypoints may be classified as ATC compulsory points. ATC requires the pilot to make a communications report at these waypoints. All other waypoints may be classified as on non-compulsory reporting points and are reported only when specifically requested by ATC.

Essential Waypoints An Essential Waypoint is defined as any waypoint at which a change in course is required or as the intersection of two or more airways.

Off-Route Floating Waypoint Waypoints which are not part of any route system but are designated by the ATC authority to be charted, are considered to be Off-Route Floating Waypoints. c-3

Nonessential Waypoints Nonessential Waypoints include all other waypoints of an airway not included under Essential Waypoints.

Transition Essential Waypoints A waypoint which normally would be classified as non-essential might be required to transition from the enroute structure to the terminal structure. Waypoints falling into this category are classified as Transition Essential Waypoints. c-2

Final Approach Course Fix The Final Approach Course Fix (FACF) is a waypoint located on the coded final approach path. For Localizer-based Approach procedures, the location of the FACF is on the localizer beam center at a distance of 2 to 8 NM from the coded FAF. If the government source provides a named fix on the localizer beam at a distance of more than 8NM and this fix is within the reception range of the localizer, this fix may be designated as the FACF. On non-localizer based procedures, the FACF will be positions not less than 2NM from the coded FAF on the coded final approach path. c-14

Final Approach Fix For all non-precision approach procedures, the coded FAF shall be the fix designated by the government source as the procedure FAF, when one is published. If there is no published FAF for the non-precision procedure, one must be established according to the rules in Attachment Five to this Specification. For localizer-based precision approach procedures, the coded FAF shall be either the Outer Marker (OM) associated with the localizer or, if no OM is present, at the glide slope intercept point. For OM positions that do not lie on the localizer beam and would result in a course change of 3 degrees for more at the FAF, a point shall be computed abeam the OM, on the localizer beam center. c-5 c-12

Enroute Airway to Restricture Airspace Link The "ER" to "UR" Link indicates the physical affect of Airway to a Restrictive Airspace on an Enroute Airway segment defined by the airway segment centerline. c-8 c-7

2.0 GLOSSARY OF TERMS (cont'd)

c-12

Gateway Fix — A Gateway Fix is a waypoint associated with organized track systems across large areas which no ATS Routes have been established such as the Atlantic Ocean. It is coded into the database to indicate the point at which a change is made from ATS Route flying to random track flying.

Initial Approach Fix — An Initial Approach Fix is that fix designated by the source document as the point at which the Initial Approach segment begins. An Approach Procedure may have no IAF or multiple IAFs
.

Intermediate Approach Fix — An Intermediate Approach Fix is a point and associated Intermediate Approach Segment at which the initial approach segment can be blended into the final approach segment.

c-10

Localizer — Unless this term is specifically related to a particular type of approach, it can be used as a general reference for all types of approaches facilities that use provide an electronic course guidance signal, i.e. "localizer," including ILS, LOC, BC, IGS, LDA and SDF.

c-13

Phantom Waypoint — A database waypoint established during procedure coding to facilitate more accurate navigation by the Flight Management Computer than would be allowd using air-mass related Path Terminators to replicate source data. The waypoint finds use when such considerations as increased environmental restrictions and the congestion of the available airspace come into play. Used to permit route construction with "tract to a fix (TF)" legs.

c-12

Precision Approach Fix — A point where the glidepath intercepts the intermediate altitude. This point is the beginning of the precision final approach segment.

c-11

Precision ARC — A circular arc flight path between two known points, whose construction in tangent to the inbound and outbound paths to/from these points.

c-14

Final End Point — The Final End Point (FEP) is a waypoint located on the coded final approach path. It is located at a point defined by the intersection of the final approach course and a line perpendicular to that course through the runway threshold (LTP) or first usable landing surface for circling only procedures. It is used in non-precision approach procedures with a published missed approach point beyond the LTP and a final approach course that facilitates the calculation of vertical coding as the anchor point of the vertical angle.

2.3 Precision RNAV Terms

c-14

Landing Threshold Point — The Landing Threshold Point (LTP) is used in conjunction with the Flight Path Alignment Point (FPAP) and the geometric center of the WGS-84 ellipsoid to define the great circle plane of a RNAV-GPS/GLS final approach flight path. It is a point at the designated center of the landing runway threshold defined by latitude, longitude, and ellipsoid height and orthometric height. The LTP becomes the FPAP when the approach directions are reversed and the final approach flight paths to both runways are aligned with the runway centerline.

COMMENTARY

The term RNAV-GPS/GLS is used throughout this document to reference RNAV procedures formerly referenced as RNP RNAV.

WGS-84 Ellipsoid Height — The height in feet of a surveyed point in reference to the WGS-84 ellipsoid. The first character is a + or -.

Flight Path Control Point — The Flight Path Control Point (FPCP) is a calculated point located at the threshold crossing height directly above the Landing Threshold Point (LTP). The FPCP is in the great circle plane of the final approach flight path and is used to relate the vertical descent of the final approach flight path to the landing runway.

Flight Path Alignment Point — The Flight Path Alignment Point (FPAP) is used in conjunction with the Landing Threshold Point (LTP) and the geometric center of the WGS-84 ellipsoid to define the great circle plane of a RNAV-GPS/GLS final approach flight path. Where the final approach flight path is aligned with the runway centerline, the FPAP is the designated center of the opposite runway landing threshold, defined by latitude, longitude, ellipsoid height and orthometric height. In these cases, the FPAP becomes the LTP when the approach directions are reversed. Where the final approach flight path is offset from the extended runway centerline by an angular amount of 3 degrees or less, the FPAP is calculated to a new position, rotated from the LTP by the angular amount of the offset.

2.0 GLOSSARY OF TERMS (cont'd)

2.3 Precision RNAV Terms (cont'd)

Glide Path Angle	The glide path angle is an angle, measured at the FPCP, that establishes the intended descent gradient for the final approach flight path of an RNAV-GPS/GLS approach procedure. It is measured from a horizontal plane that is parallel to the WGS-84 ellipsoid at the FPCP.
Precision Approach Path Point Data CRC	An 8 character hexadecimal representation of the 32-bit CRC value provided by the source for the information contained in the aeronautical data fields being monitored for integrity. See Chapter 6 for details on CRC calculation.

c-14

3.0 NAVIGATION DATA c-14

3.1 User File Organization

The records defined in Chapter 4 of this document are sorted such that they appear on the master tape in alphabetical/numerical order by column. The sorting necessary to achieve this process is as follows. Records are first divided into "standard" and "tailored" groups by the content of the first column. "Standard" or "S" records are located on the tape ahead of the "tailored" or "T" records. The next columns order the "standard" records alphabetically by AREA Code and "tailored" records by Airline Code. After that the column content orders both "standard" and "tailored" records by Sections. This process is illustrated in Figure 3-1. Sorting continues this way, column by column, until each record is uniquely defined.

c-14 The column number at which this occurs for each record type may be determined by inspecting the record layout forms of Figure 4-1 of this document. The master tape may then be assembled with records located in the positions thus defined.

While the sorting process is basically alphabetical, it has to accommodate columns that are permitted to contain blanks and/or numeric characters. When this occurs, blank characters will be sorted before numerics and numeric characters will be sorted before alphabetic characters.

3.2 Master Airline User File Content

3.2.1 General

c-14 This Section of this document defines the content of each section of the Master Airline User File. As indicated in Section 1.2 of this document, this file can be composed of the "standard" records or "standard" and "tailored" records, sorted according to the procedure set forth in Section 3.1 above.

The Master Airline User File includes all records listed in Section 3.2.

3.2.2 Navaid Section (D)

3.2.2.1 VHF Navaid Section (D), Subsection (Blank)

c-10 The VHF NAVAID Subsection should contain all the VORs, VORDMEs, VORTACs, DMEs, ILS DMEs and MLS DMEs as well as all TACANs paired with civil-use VHF NAVAID frequencies. It may also contain TACANs paired with military-use VHF frequencies for specific applications. As a minimum, all VHF NAVAIDs reference by records in Sections 3.2.3.3, 3.2.3.4, 3.2.4.1, 3.2.4.4, 3.2.4.5, 3.2.4.6, 3.2.4.11, 3.2.4.12, 3.2.5, 3.2.10, c-14 3.3.5, 3.3.6, 3.3.7 and 3.3.8 should be available in the VHF NAVAID Subsection. ILS DMEs and MLS DMEs c-10 included can be for either Airports or Heliports.

3.2.2.2 NDB Navaid Section (D), Subsection (B)

c-9 The NDB NAVAID Subsection file should contain all LF and MF NDBs and selected Marine Beacons defined in the enroute structure. As a minimum, all Enroute NDB NAVAIDs referenced by records in Sections 3.2.3.3, 3.2.3.4, 3,2,3.6, 3.2.4.4, 3.2.4.5, 3.2.4.6, 3.2.4.11, 3.2.4.12, 3.2.5, 3.2.10, 3.3.5, 3.3.6, 3.3.7 and 3.3.8 should be available in the NDB NAVAID Subsection.

3.2.3 Enroute Section

3.2.3.1 Enroute Waypoint Section (E), Subsection (A)

The Enroute Waypoint Subsection file should contain all named intersections defined in the enroute structure. As a minimum, all enroute waypoints referenced in Sections 3.2.3.3, 3.2.3.4, 3.2.4.4, 3.2.4.5, 3.2.4.6, 3.2.5, 3.2.10, 3.3.5, 3.3.6 and 3.3.7 should be available in the Enroute Waypoint Subsection. c-14

3.2.3.2 Enroute Airway Marker Section (E), Subsection (M)

The Enroute Airway Markers Subsection file should contain all government-published airways marker facilities.

3.2.3.3 Holding Patterns (E), Subsection (P)

The Holding Pattern Subsection file should contain all holding patterns shown on aeronautical charts. c-10

3.2.3.4 Enroute Airways Section (E), Subsection (ER)

The Enroute Airways Subsection file should contain all government-designated airways.

3.2.3.5 Enroute Airways Restrictions Section (E), Subsection (EU)

The Enroute Airways Restrictions Subsection file contains the official altitude, time and usage restrictions for Enroute Airways referenced in Section 3.2.3.4.

3.2.3.6 Enroute Communications Section (E), Subsection (EV)

The Enroute Communications Subsection file should contain all government-published enroute communications facilities. c-8

3.2.4 Airport Section (P)

3.2.4.1 Airport Reference Points Section (P), Subsection (PA)

The Airport Reference Points Subsection file should contain reference points for all airports having at least one hard surfaced runway.

3.2.4.2 Airport Gates Section (P), Subsection (PB)

The Airport Gates Subsection should contain all gates published in official government documents to support the Airport referenced in Section 3.2.4. If the Airport is provided as "standard" data, the Gates may be provided as "standard" or "tailored" data, depending on whether the gate owner and operator is the public sector or a specific airline. If the Airport is provided as "tailored" data, the Gates must also be provided as "tailored" data. c-14

3.2.4.3 Airport Terminal Waypoints Section (P), Subsection (PC)

The Terminal Waypoints Subsection file should contain those waypoints necessary to support Standard Instrument Departures (SIDs), Standard Terminal Arrival Routes (STARs) and Approaches specified in Sections 3.2.4.4, 3.2.4.5 and 3.2.4.6, excluding the landing threshold. If a waypoint is used in both the terminal and enroute areas, it should appear in the Enroute (EA) file.

3.2.4.4 Airport Standard Instrument Departures SIDs) Section (P), Subsection (PD)

The SIDs Subsection file should contain all government published SIDs from airports referenced in Section 3.2.4.1.

3.2.4.5 Airport Standard Terminal Arrival Routes (STARs) Section (P), Subsection (PE)

The STARs Subsection file should contain all government published STARs to the airports referenced in Section 3.2.4.1.

3.2.4.6 Airport Approaches Section (P), Subsection (F)

The Approach Route Subsection file should contain at least one instrument approach, if published, for each runway to the airports referenced in Section 3.2.4.1 except Radar Approaches. Approach Procedures types have been identified and are covered by coding rules elsewhere in this specification.

c-8

This specification originally subscribed to an approach procedures coding system known as the Multiple Approach Coding Concept. The concept is defined as one approach procedure for a given reference facility to a given single runway. For example, an ILS based and a VOR based procedure to the same runway may be included but not an ILS and an ILS Localizer only or a VORDME and a VOR only to the same runway. Through several Supplements to this specification, modifications to this concept have been incorporated and it is now possible to have multiples of the same reference facility or to address reference facilities in a more specific manner. For details see Chapter Five, Sections 5.7 and 5.10. Data Suppliers are requested to supply to either the original or to the expanded concept.

c-14

3.0 NAVIGATION DATA (cont'd)

c-5

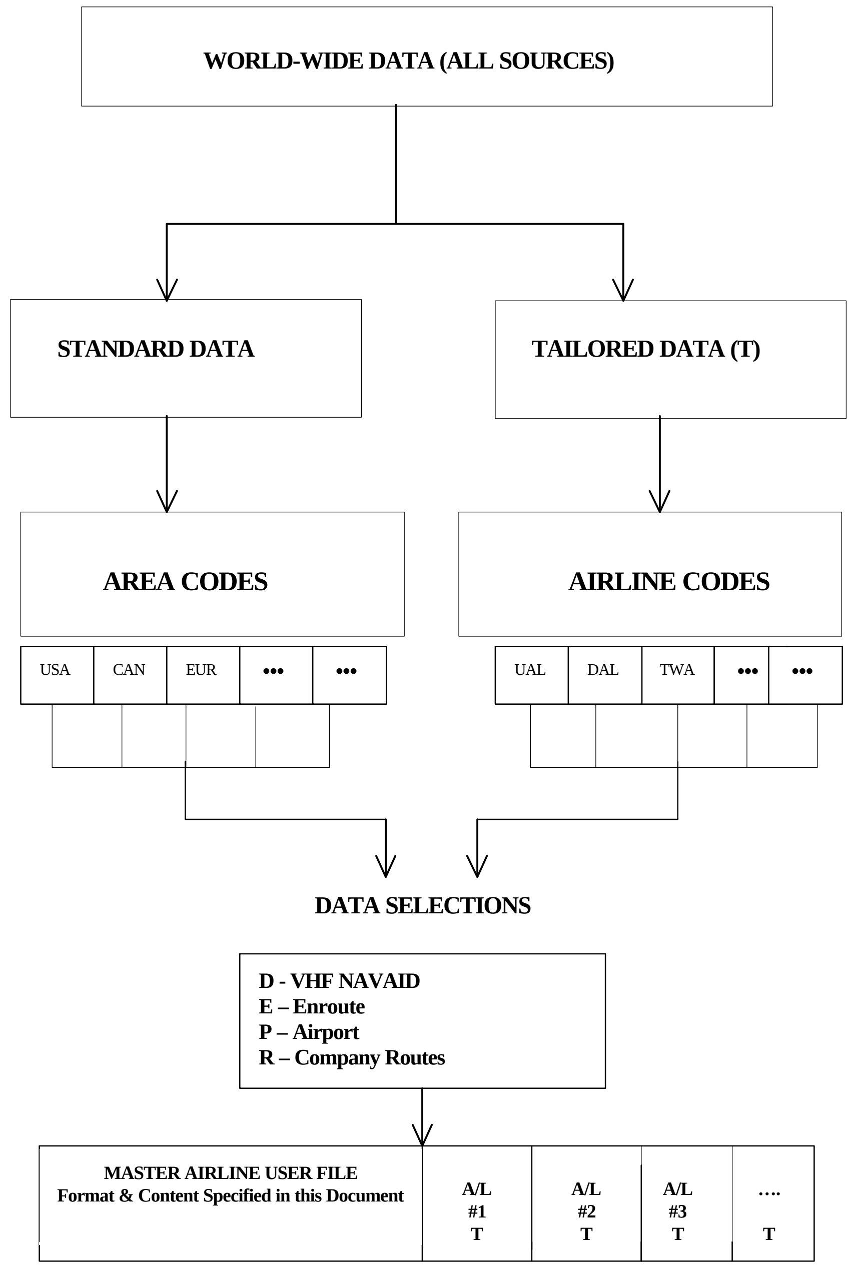


Figure 3-1
Data Sorting Necessary to Achieve Step 1
of FDSU Tape Production Process

3.0 NAVIGATION DATA (cont'd)

3.2.4.7 Airport Runway Section (P), Subsection (PG)

c-5 The Runway Subsection file should contain all runways referenced in Sections 3.2.4.4, 3.2.4.5 and 3.2.4.6.

3.2.4.8 Airport and Heliport Localizer/Glide Slope Section (P), Subsection (I)

The Localizer/Glide Slope Subsection file should contain all government published localizer facilities to airport runways and/or helipad referenced in Section 3.2.4.7 or 3.3.3. As a minimum, the section should contain all localizer facilities referenced in Sections 3.2.4.6 and 3.3.7.

c-14 3.2.4.9 Airport and Heliport MLS Section (P), Subsection (L)

The MLS Subsection file should contain all government published MLS facilities for airport runways and/or helipads referenced in Section 3.2.4.7 or 3.3.3.

3.2.4.10 Airport and Heliport Marker/Localizer Section (P), Subsection (M)

c-14 The Airport and Heliport Localizer Marker Subsection file should contain all government published Markers and locators associated with the localizers referenced in Section 3.2.4.8. As a minimum, this Subsection should contain all markers referenced in Sections 3.2.4.6 and 3.3.7.

3.2.4.11 MSA Section (P), Subsection (PS)

The MSA (Minimum Sector Altitude) Subsection should contain the Sector Altitude for all government published SIDs referenced in Section 3.2.4.4, published STARs referenced in Section 3.2.4.5 and approach procedures referenced in Section 3.2.4.6.

c-8 3.2.4.12 Airport Communications Section (P), Subsection (PV)

The Airport Communications Subsection file should contain all government-published airport communications facilities for airports referenced in Section 3.2.4.1.

3.2.4.13 Airport and Heliport Terminal NDB Section (P), Subsection (N)

c-10 The Terminal NDB Subsection file should contain those Terminal NDB NAVAIDS referenced by records in
c-14 Sections 3.2.3.3, 3.2.4.4, 3.2.4.5, 3.2.4.6, 3.2.4.11, 3.2.5, 3.2.9, 3.3.5, 3.3.6, 3.3.7 and 3.3.8. If a NDB is used in both the terminal and enroute environments, it should
c-10 appear in the Enroute NDB NAVAID (DB) file.

3.2.4.14 Airport and Heliport Path Point Section (P), Subsection (P)

c-14 The Path Point Subsection file should contain the Path Point records required to support all RNAV-GPS/GLS Approach Procedures referenced in Sections 3.2.4.6 and 3.3.7.

Note: The pathpoint concept is currently being developed by the FAA in cooperation with industry and other governments. Most of the items in the pathpoint record have been finalized; however, many of the fields have not had final resolution and therefore care should be taken before creating software for implementation. The pathpoint record continues to be included in ARINC Specification 424 as a concept that will have changes as the concept is matured.

3.2.4.15 Flight Planning Arrival/Departure Data Record Section (P), Subsection (R)

The Flight Planning Arrival/Departure Data Subsection should contain a set of data that meet the needs of computerized flight planning for Arrival and Departure designations, transitions and distances for airports referenced in Section 3.2.4.1.

3.2.4.16 GNSS Landing System (GLS) Section (P), Subsection (T)

The GLS Subsection file should contain all those government-published GNSS Landing System approaches for airport runways and/or helipads referenced in Section 3.2.4.7 and 3.3.3. As a minimum, the section should contain all GLS approaches referenced in Section 3.2.4.6 and 3.3.7. c-14

3.2.5 Company Route and Alternation Destination Section (R)

3.2.5.1 Company Route Section (R), Subsection (Blank)

The Company Route information is available only as tailored data records.

3.2.5.2 The Alternate Record Section (R), Subsection (A)

The Alternate Record Section defines departure, destination or enroute alternate airports or alternate company routes. The data is only available as tailored data records.

3.2.6 Special Use Airspace Section (U)

3.2.6.1 Restrictive Airspace Section (U), Subsection (UR)

The Restrictive Airspace Subsection should contain all government published restrictive airspace areas containing their lateral and vertical limits. c-5

3.2.6.2 FIR/UIR Section (U), Subsection (F)

The FIR/UIR Subsection file should contain all government-published FIR and UIR boundaries, including both lateral and vertical limits.

3.2.6.3 Controlled Airspace Section (U), Subsection (C)

The Controlled Airspace Subsection file should contain those government-published airspaces required to support the specific needs of this Specification, see Chapter Five, c-14

3.0 NAVIGATION DATA (cont'd)

c-14 Section 5.217, as they relate to Airports and Heliports, including their lateral and vertical limits.

3.2.7 Tables Section (T)

3.2.7.1 Cruising Tables Section (T), Subsection (C)

The Cruising Table Subsection file should contain the standard ICAO Cruising Level Table and all modified Cruising Level Tables required to support Sections 3.2.3.4 and 3.2.6.2.

3.2.7.2 Geographical Reference Table Section (T), Subsection (G)

c-13

The Geographical Reference Table Subsection file should contain all geographical cross reference entries required to create linkage to Preferred Route Identifiers, Section 3.2.9, for wide area origin or destination entries.

3.2.8 MORA Section (A), Subsection (AS)

c-5 The MORA Subsection should contain all grid MORA values for each degree of latitude and longitude.

3.2.9 Preferred Routes Section (E), Subsection (T)

The Preferred Route Subsection file will contain frequently used routes (i.e., North American Preferred Routes, North American Routes to the North Atlantic Traffic, and Europe Preferential Route System). These routes will, in effect, combine existing Subsection files
c-8 [SID (PD), STAR (PE), Enroute Airway (ER), Enroute Waypoint (EA), Terminal Waypoint (PC, VHF NAVAID (D), NDB NAVAID (DB), Airport (P)] to form a continuous route structure. This route structure may be referenced by the Company Route records.

3.2.10 Preferred Routes Section (E), Subsection (ET)

The Preferred Route Subsection file will contain frequently used routes (i.e., North American Preferred Routes, North American Routes to the North Atlantic Traffic, and Europe Preferential Route System). These routes will, in effect, combine existing Subsection files [SID (PD), STAR (PE), Enroute Airway (ER), Enroute
c-9 Waypoint (EA), Terminal Waypoint (PC, VHF NAVAID (D), NDB NAVAID (DB), Airport (P)] to form a continuous route structure. This route structure may be referenced by the Company Route records.

3.3 Master Helicopter User File Content

3.3.1 General

The Master Helicopter User File will incorporate the use of records from Section 3.2, Master Airline User File as well as sections unique to helicopter operations.

c-14 3.3.2 Jointly and Specifically Used Sections/Subsections

Section 3.3, Master Helicopter User File will jointly use the following sections from Section 3.2, Master Airline User File:

3.2.2	VHF Navaid Section
3.2.3	Enroute Section
3.2.4	Airport Section, but limited to Airports with Helipads
3.2.4.8	Airport and Heliport Localizer/Glide Slope Section
3.2.4.9	Airport and Heliport MLS Section
3.2.4.10	Airport and Heliport Localizer Marker Section
3.2.4.13	Airport and Heliport Terminal NDB Section
3.2.5	Company Route Section
3.2.6	Special Use Airspace Section
3.2.7	Tables Section
3.2.8	MORA Section
3.2.9	Preferred Route Section
3.2.11	GLS

Section 3.3, Master Helicopter User File will include the following specifically used paragraphs:

3.3.3	Heliport Section (H), Subsection (A)
3.3.4	Heliport Terminal Waypoint Section (H), Subsection (C)
	Heliport Terminal Procedure Section (H),
3.3.5	SID Subsection (D)
3.3.6	STAR Subsection (E)
3.3.7	Approach Subsection (F)
3.3.8	Heliport MSA Section (H), Subsection (S) c-14
3.3.9	Heliport Communications Section (H), Subsection (V)

3.3.3 Heliport Section (H), Subsection (A)

The Heliport Subsection file should contain reference points for all government-published helipads at heliport and airport facilities.

3.3.4 Heliport Terminal Waypoints Section (H), Subsection (C)

The Heliport Terminal Waypoint Subsection should contain those waypoints necessary to support Standard Terminal Departures (SIDs), Standard Terminal Arrival Routes (STARs) and Approaches specified in Sections 3.3.5, 3.3.6 and 3.3.7, excluding Helipads as a fix. If a waypoint is used in both the terminal area and the enroute areas, is should appear in the Enroute (EA) file.

3.3.5 Heliport Standard Instrument Departures (SIDs) Section (H), Subsection (D)

The SIDs Subsection file should contain all government published SIDs from Heliports referenced in Section 3.3.3.

3.3.6 Heliport Standard Terminal Arrival Routes (STARs) Section (H), Subsection (E)

The STARs Subsection file should contain all government published STARs to Heliports referenced in Section 3.3.3.

3.3.7 Heliport Approaches Section (H), Subsection (F)

The Approach Route Subsection file should contain all government published approaches to Heliports referenced in Section 3.3.3. Approach procedure types have been identified and are covered by coding rules elsewhere in this specification.

3.3.8 Heliport MSA Section (H), Subsection (S)

c-14

The MSA (Minimum Sector Altitude) Subsection should contain the Sector Altitude for all government published SIDS referenced in Section 3.3.5, published STARs referenced in Section 3.3.6 and approach procedures referenced in Section 3.3.7.

3.3.9 Heliport Communications Section (H), Subsection (V)

The Heliport Communications Subsection file should contain all government published heliport communications facilities for heliports referenced in Section 3.3.3.

4.0 NAVIGATION DATA - RECORD LAYOUT

4.0.1 General

c-14 In an effort to describe the Master Airline and Master Helicopter sections, Section 4 is divided into Section 4.1 Navigation Data - Record Layout, Master Airline User Content and Section 4.2 Navigation Data - Record Layout, Master Helicopter User Content.

Each record is made up of combinations of the fields described in Chapter 5 of this document. This chapter sets forth the standard layout of each type of record found in the data base. These layouts are also presented diagrammatically at the end of this section. Paragraphs and Tables in the 4.1 series are the record types, which have been identified as being a part of Master Airline User Content. Paragraphs and Tables in the 4.2 series are the record types, which have been identified as being part of the Master Helicopter User Content. This paragraph and table numbering system does not prevent any given data base from including any of the records defined in this document. The separation is for editorial and reference purposes only.

c-1 Each record contains 132 character positions or columns. Not all of these are used in every record. Some are left blank to permit like information to appear in the same columns of different records and others are reserved for the possible future expansion of the record's content. In the tables that follow, the former are identified by the term "Blank (Spacing)" under the "Field" heading. The latter are identified by the term "Reserved," followed by the function for which the reservation is made (where it can specifically be stated).

The tables show the record columns occupied by each field. For convenience, the number of characters in each field is shown in brackets following the field name. Also, the paragraph numbers in Chapter 5 of this document wherein individual fields are defined are referenced. Each table appears under a paragraph heading that is followed by the data base section and subsection codes employed in the record described.

4.1 Master Airline User File

4.1.2 VHF NAVAID Record (D)

c-10 The VHF NAVAID file contains details of all VOR, VOR/DME, VORTAC, DME and TACAN stations within the geographical area of interest. For VOR and TACAN stations having the same identifier but different operating frequencies, the TACAN is available and the VOR is suppressed unless the VOR is required to support Sections 3.2.3.3, 3.2.3.4, 3.2.4.4, 3.2.4.5, 3.2.4.6, c-14 3.2.4.11, 3.2.5, 3.2.9, 3.3.5, 3.3.6, 3.3.7 or 3.3.8. In such cases the VOR is available and the TACAN is suppressed.

4.1.2.1 VHF NAVAID Primary Records

Column	Field Name (Length)	Reference	
1	Record Type (1)	5.2	
2 thru 4	Customer/Area Code (3)	5.3	c-1
5	Section Code (1)	5.4	
6	Subsection Code (1)	5.5	c-5
7 thru 10	Airport ICAO Identifier (4)	5.6	
11 thru 12	ICAO Code (2)	5.14	
13	Blank (spacing) (1)		
14 thru 17	VOR Identifier (4)	5.33	
18 thru 19	Blank (Spacing) (2)		
20 thru 21	ICAO Code (2)	5.14	
22	Continuation Record No. (1)	5.16	
23 thru 27	VOR Frequency (5)	5.34	
28 thru 32	NAVAID Class (5)	5.35	c-1
33 thru 41	VOR Latitude (9)	5.36	
42 thru 51	VOR Longitude (10)	5.37	
52 thru 55	DME Ident (4)	5.38	
56 thru 64	DME Latitude (9)	5.36	
64 thru 74	DME Longitude (10)	5.37	
75 thru 79	Station Declination (5)	5.66	c-5
80 thru 84	DME Elevation (5)	5.40	c-1
85	Figure of Merit (1)	5.149	
86 thru 87	ILS/DME Bias (2)	5.90	
88 thru 90	Frequency Protection (3)	5.150	
91 thru 93	Datum Code (3)	5.197	c-10
94 thru 123	VOR Name (30)	5.71	
124 thru 128	File Record No. (5)	5.31	c-5
129 thru 132	Cycle Date (4)	5.32	

4.1.2.2 VHF NAVAID Continuation Records

Column	Field Name (Length)	Reference	
1 thru 21	Fields as on Primary Records		
22	Continuation Record No. (1)	5.16	
23	Reserved (Spacing) (1)		
24 thru 92	Notes (69)	5.61	c-1
93 thru 123	Reserved (expansion) (31)		
124 thru 128	File Record No. (5)	5.31	
129 thru 132	Cycle Date (4)	5.32	

Note: Column 23 is reserved for an application code character. c-4

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.2.3 VHF NAVAID Simulation Continuation Records

c-4

Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23	Application Type (1)	5.91
24 thru 27	Blank (Spacing) (4)	
28 thru 32	Facility Characteristics (5)	5.93
33 thru 74	Reserved (Spacing) (42)	
75 thru 79	Magnetic Variation (5)	5.39
80 thru 84	Facility Elevation (5)	5.92
85 thru 123	Reserved (Expansion) (39)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.2.4 VHF NAVAID Flight Planning Continuation Records

c-10

This Continuation Record is used to indicate the FIR and/or UIR within which the VHF NAVAID defined in the Primary Record is located and the Start/End validity dates/times of the Primary Record.

c-8

Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23	Application Type (1)	5.91
24 thru 27	FIR Identifier (4)	5.116
28 thru 31	UIR Identifier (4)	5.116
32	Start/End Indicator (1)	5.152
33 thru 43	Start/End Date (11)	5.153
44 thru 123	Reserved (Expansion)(80)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.2.5 VHF NAVAID Flight Planning Continuation Records

c-14

This Continuation Record is used to indicate the fields of the Primary Record that are changed. Used in conjunction with Section 4.1.2.4.

c-5

Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23 thru 123	Fields as on Primary Records	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.2.6 VHF NAVAID Limitation Continuation Record

c-12 c-14 c-12

This Continuation Record is used to provide details on signal limitations of the VHF Navaid contained in the Primary Record Section 4.1.2.1. Note that multiple records formatted as in Section 4.1.2.6 may be included for a single Primary Record. As "Service Volume" or "Designated Operational Coverage" may also be considered limitations, this information is also provided for each navaid listed in the Primary Records, where such information is available.

c-12

Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23	Reserved (1)	
24	Navaid Limitation Code (1)	5.205
25	Component Affected Indicator (1)	5.206
26 thru 27	Sequence Number (2)	5.12
28 thru 29	Sector From/Sector To (2)	5.207
30	Distance Description (1)	5.187
31 thru 36	Distance Limitation (6)	5.208
37	Altitude Description (1)	5.29
38 thru 43	Altitude Limitation (6)	5.209
44 thru 45	Sector From/Sector To (2)	5.207
46	Distance Description (1)	5.187
47 thru 52	Distance Limitation (6)	5.208
53	Altitude Description (1)	5.29
54 thru 59	Altitude Limitation (6)	5.209
60 thru 61	Sector From/Sector To (2)	5.207
62	Distance Description (1)	5.187
63 thru 68	Distance Limitation (6)	5.208
69	Altitude Description (1)	5.29
70 thru 75	Altitude Limitation (6)	5.209
76 thru 77	Sector From/Sector To (2)	5.207
78	Distance Description (1)	5.187
79 thru 84	Distance Limitation (6)	5.208
85	Altitude Description (1)	5.29
86 thru 91	Altitude Limitation (6)	5.209
92 thru 93	Sector From/Sector To (2)	5.207
94	Distance Description (1)	5.187
95 thru 100	Distance Limitation (6)	5.208
101	Altitude Description (1)	5.29
102 thru 107	Altitude Limitation (6)	5.209
108	Sequence End Indicator (1)	5.210
109 thru 123	Blank (spacing) (15)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.3 NDB NAVAID Record (DB or PN)

c-14 c-10

The Enroute NDB NAVAID file (DB) contains all enroute on-airway and off-airway NDBs within the geographical area of interest. The Terminal NDB NAVAID file (PN) contains NDBs associated with the Airports contained in Subsection 3.2.4.1 and Heliport contained in Section 3.3.3. Terminal NDBs referenced to two or more Airports or Heliports will be available in the Enroute NDB Subsection unless that handling would create duplicate NDB identifiers within that Subsection. Marine Beacons shown on aeronautical charts may also be included in this record type.

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.3.1 NDB NAVAID Primary Records

c-10

Columns	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 10	Airport ICAO Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5.14
13	Blank (Spacing) (1)	
14 thru 17	NDB Identifier (4)	5.33
18 thru 19	Blank (Spacing) (2)	
20 thru 21	ICAO Code (2)	5.14
22	Continuation Record No. (1)	5.16
23 thru 27	NDB Frequency (5)	5.34
28 thru 32	NDB Class (5)	5.35
33 thru 41	NDB Latitude (9)	5.36
42 thru 51	NDB Longitude (10)	5.37
52 thru 74	Blank (Spacing) (6)	
75 thru 79	Magnetic Variation (5)	5.39
80 thru 85	Blank (Spacing) (6)	
86 thru 90	Reserved (Expansion) (5)	
91 thru 93	Datum Code (3)	5.197
94 thru 123	NDB Name (30)	5.71
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Data (4)	5.32

4.1.3.2 NDB NAVAID Continuation Records

c-1

Columns	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23	Reserved (Spacing) (1)	
24 thru 92	Notes (69)	5.61
93 thru 123	Reserved (Expansion) (31)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Data (4)	5.32

Note: Column 23 is reserved for an application code character.

4.1.3.3 NDB NAVAID Simulation Continuation Record

c-4

Columns	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23	Application Type (1)	5.91
24 thru 27	Blank (Spacing) (4)	
28 thru 32	Facility Characteristics	5.93
33 thru 79	Reserved (Spacing) (47)	
80 thru 84	Facility Elevation (5)	5.92
85 thru 123	Reserved (Expansion) (39)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Data (4)	5.32

4.1.3.4 NDB NAVAID Flight Planning Continuation Records

This Continuation Record is used to indicate the FIR and/or UIR within which the NDB NAVAID defined in the Primary Record is located and the Start/End validity dates/times of the Primary Record. c-5

c-10 c-8

Columns	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23	Application Type (1)	5.91
24 thru 27	FIR Identifier (4)	5.116
28 thru 31	UIR Identifier (4)	5.116
32	Start/End Indicator (1)	5.152
33 thru 43	Start/End Date (11)	5.153
44 thru 123	Reserved (Expansion) (80)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Data (4)	5.32

4.1.3.5 NDB NAVAID Flight Planning Continuation Records

This Continuation Record is used to indicate the fields of the Primary Record that are changed. Used in conjunction with Section 4.1.3.4. c-14

c-5

Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23 thru 123	Fields as on Primary Records	
24 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.4 Waypoint Record (EA) or (PC)

The Enroute Waypoint file (EA) contains all enroute on-airway and off-airway waypoints within a desired geographical area. The Airport Terminal Waypoint file (PC) contains all terminal waypoints within the geographical area of each airport. Airport Terminal Waypoints utilized by two or more airports will be stored in the Enroute Waypoint Subsection (EA) to eliminate duplication. Terminal Waypoints used jointly by an airport and a heliport are also stored in the Enroute Waypoint file. The Enroute Waypoint File will contain waypoints established for Helicopter Airways. For Heliport Terminal Waypoints (HC) see Section 4.2.2. c-14

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.4.1 Holding Pattern Waypoint Primary Records

	Column	Field Name (Length)	Reference
	1	Record Type (1)	5.2
	2 thru 4	Customer/Area Code (3)	5.3
	5	Section Code (1)	5.4
c-10	6	Subsection Code (1)	5.5 Note 1
c-1	7 thru 10	Region Code (4)	5.41 Note 2
	11 thru 12	ICAO Code (2)	5.14
c-10	13	Subsection (1) Note 1	5.5 Note 1
	14 thru 18	Waypoint Identifier (5)	5.13
	19	Blank (Spacing) (1)	
c-2	20 thru 21	ICAO Code (2)	5.14
	22	Continuation Record No. (1)	5.16
	23 thru 26	Blank (Spacing) (4)	
	27 thru 29	Waypoint Type (3)	5.42
c-5	30 thru 31	Waypoint Usage (2)	5.82
	32	Blank (Spacing) (1)	
c-2	33 thru 41	Waypoint Latitude (9)	5.36
	42 thru 51	Waypoint Longitude (10)	5.37
	52 thru 74	Blank (Spacing) (23)	
c-5	75 thru 79	Dynamic Mag. Variation (5)	5.39
	80 thru 84	Reserved (Expansion) (5)	
	85 thru 87	Datum Code (3)	5.197
c-9	88 thru 95	Reserved (Expansion) (8)	
	96 thru 98	Name Format Indicator (3)	5.196
	99 thru 123	Waypoint Name/ Description (25)	5.43
c-1	124 thru 128	File Record No. (5)	5.31
	129 thru 132	Cycle Date (4)	5.32

c-14 Note 1: In Enroute Waypoint Records, the Subsection Code occupies column 6, with column 13 blank. In Airport or Heliport Terminal Waypoint Records, the Subsection Code occupies Column 13, with column 6 blank.

c-10 Note 2: In Enroute Waypoint records the code "ENRT" is used. In Terminal Waypoint records, the region code field contains the Airport ICAO Identification code.

4.1.4.2 Waypoint Continuation Records

	Columns	Field Name (Length)	Reference
c-1	1 thru 21	Fields as on Primary Records	
	22	Continuation Record No. (1)	5.16
	23	Reserved (Spacing) (1)	
c-6	24 thru 92	Notes (69)	5.61
	93 thru 123	Reserved (Expansion) (31)	
c-1	124 thru 128	File Record No. (5)	5.31
	129 thru 132	Cycle Data (4)	5.32

NOTE: Column 23 is reserved for an application code character.

4.1.4.3 Waypoint Flight Planning Continuation Records

This Continuation Record is used to indicate the FIR and/or UIR within which the Waypoint defined in the Primary Record is located and the Start/End validity dates/times of the Primary Record. c-10

c-5

Column	Field Name (Length)	Reference	
1 thru 21	Fields as on Primary Records		
22	Continuation Record No. (1)	5.16	
23	Application Type (1)	5.91	
24 thru 27	FIR Identifier (4)	5.116	
28 thru 31	UIR Identifier (4)	5.116	c-8
32	Start/End Indicator (1)	5.152	
33 thru 43	Start/End Date (11)	5.153	
44 thru 123	Reserved (Expansion) (80)		
124 thru 128	File Record No. (5)	5.31	
129 thru 132	Cycle Date (4)	5.32	

4.1.4.4 Waypoint Flight Planning Continuation Records

This Continuation Record is used to indicate the fields of the Primary Record that are changed. Used in conjunction with Section 4.1.4.3.

Column	Field Name (Length)	Reference	
1 thru 21	Fields as on Primary Records		
22	Continuation Record No. (1)	5.16	c-5
23 thru 123	Fields as on Primary Records		
124 thru 128	File Record No. (5)	5.31	
129 thru 132	Cycle Date (4)	5.32	

4.1.5 Holding Pattern Records (EP)

The Enroute Holding Patterns contained in this file are holding patterns recommended by the official government authority for inclusion on enroute aeronautical charts. The Terminal Holding Patterns included in this file are holding patterns recommended for aeronautical charts for the geographical area of an airport or heliport. The type, Enroute or Terminal, will be determined by the Subsection of the fix upon which the holding is predicated. c-10

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.5.1 Holding Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 10	Region Code (4)	5.41 Note 1
11 thru 12	ICAO Code (2)	5.14 Note 1
13 thru 27	Blank (Spacing) (15)	
28 thru 29	Duplicate Identifier (2)	5.114
30 thru 34	Fix Identifier (5)	5.13
35 thru 36	ICAO Code (2)	5.14
37	Section Code (1)	5.4
38	Subsection Code (1)	5.5
39	Continuation Record No. (1)	5.16
40 thru 43	Inbound Holding Course (4)	5.62
44	Turn Direction (1)	5.63
45 thru 47	Leg Length (3)	5.64
48 thru 49	Leg Time (2)	5.65
50 thru 54	Minimum Altitude (5)	5.30
55 thru 59	Maximum Altitude (5)	5.127
60 thru 62	Holding Speed (3)	5.175
63 thru 98	Reserved (Expansion) (36)	
99 thru 123	Notes (25)	5.60
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note 1: In Enroute Fix Holding Pattern records, the code of "ENRT" is used in the Region Code field and the ICAO Code field is blank. In Terminal Fix Holding record, the Region Code field contains the identifier of the Airport or Heliport with which the holding is associated. The ICAO Code field will not be blank. This information will uniquely identify the Terminal NDB, Airport Terminal Waypoint or Heliport Terminal Waypoint.

4.1.5.2 Holding Pattern Continuation Records

Column	Field Name (Length)	Reference
1 thru 38	Fields as on Primary Records	
39	Continuation Record No. (1)	5.16
40	Reserved (Spacing) (1)	
41 thru 109	Notes (69)	5.61
110 thru 123	Reserved (Expansion) (14)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note: Column 40 is reserved for an application code character.

4.1.6 Enroute Airways Records (ER)

The Enroute Airways file will contain the sequential listing of officially published airways and other established ATS Routes by geographical areas. The file also contains published airways specific to helicopter operations.

4.1.6.1 Enroute Airways Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 13	Blank (Spacing) (7)	
14 thru 18	Route Identifier (5)	5.8
19	Reserved (1)	Note 1
20 thru 25	Blank (Spacing) (6)	
26 thru 29	Sequence Number (4)	5.12
30 thru 34	Fix Identifier (5)	5.13
35 thru 36	ICAO Code (2)	5.14
37	Section Code (1)	5.4
38	Subsection (1)	5.5
39	Continuation Record No. (1)	5.16
40 thru 43	Waypoint Description Code (4)	5.17
44	Boundary Code (1)	5.18
45	Route Type (1)	5.7
46	Level (1)	5.19
47	Direction Restriction (1)	5.115
48 thru 49	Cruise Table Indicator (2)	5.134
50	EU Indicator (1)	5.164
51 thru 54	Recommended NAVAID (4)	5.23
55 thru 56	ICAO Code (2)	5.14
57 thru 59	RNP (3)	5.211
60 thru 62	Blank (Spacing) (3)	
63 thru 66	Theta (4)	5.24
67 thru 70	Rho (4)	5.25
71 thru 74	Outbound Magnetic Course 4)	5.26
75 thru 78	Route Distance From (4)	5.27
79 thru 82	Inbound Magnetic Course (4)	5.28
83	Blank (Spacing) (1)	
84 thru 88	Minimum Altitude (5)	5.30
89 thru 93	Minimum Altitude (5)	5.30
94 thru 98	Maximum Altitude (5)	5.127
99 thru 123	Reserved (Expansion) (25)	
124 thru 128	File Record No (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note 1: The standard length for the Route Identifier is five characters. Some users envisage the need for a six-character field. This reserved column will permit this usage. Some data suppliers may use this position for the ATS Service suffix associated with some Route Identifiers.

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.6.2 Enroute Airways Continuation Records

c-4

Column	Field Name (Length)	Reference
1 thru 38	Fields as on Primary Records	
39	Continuation Record No. (1)	5.16
40	Reserved (Spacing) (1)	
41 thru 109	Notes (69)	5.61
110 thru 23	Reserved (Expansion) (14)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note: Column 40 is reserved for an application code character.

4.1.6.3 Entoute Airways Flight Planning Continuation Records

c-7

This Continuation Record is used to indicate the Start/End validity times of the Primary Record, and to indicate restrictive airspace that affects the Primary Record according to the definition given in Section 2.0, Glossary of Terms .

c-6

c-7

Column	Field Name (Length)	Reference
1 thru 38	Fields as on Primary Records	
39	Continuation Record No. (1)	5.16
40	Application Type (1)	5.91
41	Start/End Indicator (1)	5.152
42 thru 52	Start/End Date (11)	5.153
53 thru 66	Blank (Spacing) (14)	
67 thru 68	Restr. Airspace ICAO Code (2)	5.14
69	Restr. Airspace Type (1)	5.128
70 thru 79	Restr. Airspace Designation (10)	5.129
80	Restr. Airspace Multiple Code (1)	5.130
81 thru 82	Restr. Airspace ICAO Code (2)	5.14
83	Restr. Airspace Type (1)	5.12
84 thru 93	Restr. Airspace Designation (10)	5.129
94	Restr. Airspace Multiple Code (1)	5.130
95 thru 96	Restr. Airspace ICAO Code (2)	5.14
97	Restr. Airspace Type (1)	5.12
98 thru 107	Restr. Airspace Designation (10)	5.129
108	Restr. Airspace Multiple Code (1)	5.130
109 thru 110	Restr. Airspace ICAO Code (2)	5.14
111	Restr. Airspace Type (1)	5.128
112 thru 121	Restr. Airspace Designation (10)	5.129
122	Restr. Airspace Multiple Code (1)	5.130
123	Restr. Airspace Link Continuation (1)	5.174
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.6.4 Enroute Airways Flight Planning Continuation Records

c-14

This Continuation Record is used to indicate the fields of the Primary Records that are changed when used in conjunction with Start/End Indication in Section 4.1.6.3, or to indicate additional Enroute Airway to Restrictive Airspace links in continuation of Section 4.1.6.3. In this latter case, fields are defined as in Section 4.1.6.3, except that columns 41 through 52 are always blank .

c-6

Column	Field Name (Length)	Reference
1 thru 38	Fields as on Primary Records	
39	Continuation Record No. (1)	5.16
40 thru 123	Fields as on Primary Records	5.31
122 thru 128	Field Record No. (5)	5.32
129 thru 132	Cycle Date (4)	

4.1.7 Airport Records (PA)

This file contains airport information.

4.1.7.1 Airport Primary Records

Column	Field Name (Length)	Ref	
1	Record Type (1)	5.2	
2 thru 4	Customer/Area Code (3)	5.3	c-8
5	Section Code (1)	5.4	
6	Blank (spacing) (1)		
7 thru 10	Airport ICAO Identifier (4)	5.6	
11 thru 12	ICAO Code (2)	5.14	
13	Subsection Code (1)	5.5	
14 thru 16	ATA/IATA Designator (3)	5.107	c-4
17 thru 18	Reserved (Expansion) (2)		
19 thru 21	Blank (spacing) (3)		
22	Continuation Record Number (1)	5.16	
23 thru 27	Speed Limit Altitude (5)	5.73	
28 thru 30	Longest Runway (3)	5.54	c-5
31	IFR Capability (1)	5.108	
32	Longest Runway Surface Code (1)	5.249	c-14
33 thru 41	Airport Reference Pt. Latitude (9)	5.36	
42 thru 51	Airport Reference Pt. Longitude (10)	5.37	
52 thru 56	Magnetic Variation (5)	5.39	
57 thru 61	Airport Elevation (5)	5.55	c-1
62 thru 64	Speed Limit (3)	5.72	
65 thru 68	Recommended Navaid (4)	5.23	c-5
69 thru 70	ICAO Code (2)	5.14	
71 thru 75	Transitions Altitude (5)	5.53	
76 thru 80	Transition Level (5)	5.53	
81	Public/Military Indicator (1)	5.177	
82 thru 84	Time Zone (3)	5.178	
85	Daylight Indicator (1)	5.179	c-14
86	Magnetic/True Indicator (1)	5.165	
87 thru 89	Datum Code (3)	5.197	
90 thru 93	Reserved (Expansion) (4)		
94 thru 123	Airport Name (30)	5.71	
124 thru 128	File Record Number (5)	5.31	c-8
129 thru 132	Cycle Date (4)	5.32	

4.1.7.2 Airport Continuation Records

c-1

c-4

Column	Field Name (Length)	Reference
1 thru 21	Field as on Primary Records	
22	Continuation Record No. (1)	5.16
23	Reserved (Spacing) (1)	
24 thru 92	Notes (69)	5.61
93 thru 123	Reserved (Expansion) (59)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note: Column 23 is reserved for an application code character.

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.7.3 Airport Flight Planning Continuation Records

This Continuation Record is used to indicate the FIR and/or UIR within which the Airport define in the Primary Record resides in and the Start/End validity dates/times of the Primary Record and provide an indication if the Airport defined in the Primary Record is associated with Controlled Airspace.

c-13

Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23	Application Type (1)	5.91
24 thru 27	FIR Identifier (4)	5.116
28 thru 31	UIR Identifier (4)	5.116
32	Start/End Indicator (1)	5.152
33 thru 43	Start/End Date (11)	5.153
44 thru 66	Blank (spacing) (23)	
67	Controlled A/S Indicator (1)	5.217
68 thru 71	Controlled A/S Arpt Ident (4)	5.6
72 thru 73	Controlled A/S Arpt ICAO (2)	5.14
74 thru 123	Blank (spacing) (50)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Data (4)	5.32

4.1.7.4 Airport Flight Planning Continuation Records

This Continuation Record is used to indicate the fields of the Primary Record that are changed. Used in conjunction with Section 4.7.3.

c-5

Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23 thru 123	Fields as on Primary Records	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

c-14 This Continuation Record is used to indicate the fields on the Primary Record that have changed, used in conjunction with Section 4.1.7.3.

c-5

4.1.8 Airport Gate Records (PB)

This file contains passenger gate information.

4.1.8.1 Airport Gate Primary Record

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (Spacing) (1)	
7 thru 10	Airport ICAO Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5.14
13	Subsection Code (1)	5.5
14 thru 18	Gate Identifier (5)	5.56
19 thru 21	Blank (Spacing) (3)	
22	Continuation Record No. (1)	5.16
23 thru 32	Blank (Spacing) (10)	
33 thru 41	Gate Latitude (9)	5.36
42 thru 51	Gate Longitude (10)	5.37
52 thru 98	Reserved (Expansion) (47)	
99 thru 123	Notes (25)	5.60
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

c-1

4.1.8.2 Airport Gate Continuation Records

Column	Field Name (Length)	Reference
1 thru 21	Field as on Primary Records	
22	Continuation Record No. (1)	5.16
23	Reserved (Spacing) (1)	
24 thru 92	Notes (69)	5.61
93 thru 123	Reserved (Expansion) (59)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

c-9

Note: Column 23 is reserved for an application code character.

4.1.9 Airport SID/STAR/Approach (PD, PE and PF) c-4

Airport SID/STAR/Approach Records comprise three files, (PD) for SIDs, (PE) for STARs and (PF) for Approaches. The SID File contains the sequential listing of published Airport Standard Instrument Departures. The STAR File contains the sequential listing of published Airport Standard Terminal Arrival Routes. The Approach File contains the sequential listing of published

c-11 c-14

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.9.1 Airport SID/STAR/Approach Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (spacing) (1)	
7 thru 10	Airport Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5.14
13	Subsection Code (1)	5.5
14 thru 19	SID/STAR/Approach Identifier (6)	5.9, 5.10
20	Route Type (1)	5.7
21 thru 25	Transition Identifier (5)	5.11
26	Blank (spacing) (1)	
27 thru 29	Sequence Number (3)	5.12
30 thru 34	Fix Identifier (5)	5.13
35 thru 36	ICAO Code (2)	5.14
37	Section Code (1)	5.4
38	Subsection Code (1)	5.5
39	Continuation Number (1)	5.16
40 thru 43	Waypoint Description Code (4)	5.17
44	Turn Direction (1)	5.20
45 thru 47	RNP (3)	5.211
48 thru 49	Path and Termination (2)	5.21
50	Turn Direction Valid (1)	5.22
51 thru 54	Recommended Navaid (4)	5.23
55 thru 56	ICAO Code (2)	5.14
57 thru 62	ARC Radius (6)	5.204
63 thru 66	Theta (4)	5.24
67 thru 70	Rho (4)	5.25
71 thru 74	Magnetic Course (4)	5.26
75 thru 78	Route Distance/Holding Distance or Time (4)	5.27
79	RECD NAV Sect on (1)	5.4
80	RECD NAV Subsection (1)	5.5
81 thru 82	Reserved (expansion) (2)	
83	Altitude Description (1)	5.29
84	ATC Indicator (1)	5.81
85 thru 89	Altitude (5)	5.30
90 thru 94	Altitude (5)	5.30
95 thru 99	Transition Altitude (5)	5.53
100 thru 102	Speed Limit (3)	5.72
103 thru 106	Vertical Angle (4)	5.70
107 thru 111	Center Fix (5)	5.144
112	Multiple Code (1)	5.130
113 thru 114	ICAO Code (2)	5.14
115	Section Code (1)	5.4
116	Subsection Code (1)	5.5
117	GPS/FMS Indication (1)	5.222
118	Blank (spacing) (1)	
119	Apch Route Qualifier 1 (1)	5.7
120	Apch Route Qualifier 2 (1)	5.7
121 thru 123	Blank (spacing) (3)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note 1: For approach route idents including "Multiple Indicator" see 5.10.

Note 2: Columns 119 and 120 (Apch Route Qualifier 1 and 2) are required to match the Primary Record to the Continuation Record. This non-standard sorting sequence was selected to preserve the Primary Record for SID/STAR/Approach Records as much as possible as these new fields were introduce in Supplement 14.

4.1.9.2 Airport SID/STAR/Approach Continuation Records

Column	Field Name (Length)	Reference
1 thru 38	Fields as on Primary Records	
39	Continuation Record Number (1)	5.16
40	Reserved (spacing) (1)	
41 thru 44	CAT A Decision Height (4)	5.170
45 thru 48	CAT B Decision Height (4)	5.170
49 thru 52	CAT C Decision Height (4)	5.170
53 thru 56	CAT D Decision Height (4)	5.170
57 thru 60	CAT A Minimum Descent Altitude (4)	5.171
61 thru 64	CAT B Minimum Descent Altitude (4)	5.171
65 thru 68	CAT C Minimum Descent Altitude (4)	5.171
69 thru 72	CAT D Minimum Descent Altitude (4)	5.171
73 thru 85	Blank Spacing (13)	
86 thru 89	Procedure Category (4)	5.242
90 thru 92	RNP (3)	5.211
93 thru 118	Reserved (expansion) (26)	
119	Apch Route Qualifier 1 (1)	5.7
120	Apch Route Qualifier 2 (1)	5.7
121 thru 123	Blank (spacing) (3)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note 1: Column 40 is reserved for an Application Type character.

Note 2: Columns 119 and 120 (Apch Route Qualifier 1 and 2) are part of the sort key required to match the Continuation Record to the Primary Record. This non-standard sorting sequence was selected to preserve the Primary Record for SID/STAR/Approach Records as much as possible as these new fields were introduce in Supplement 14.

Note 3: For records used to defined RNAV Procedures with multiple minimums, the RNP value is carried in columns 90 thru 92 of the Continuation Record and is associated with the Procedure Category. In these cases, the RNP value in column 45 thru 47 of the Primary Record will be blank.

4.1.9.3 Airport SID/STAR/Approach Flight Planning Continuation Records

This Continuation Record is used to indicate the Leg Distance for each segment of the Route and the Start/End validity times of the Primary Record.

Column	Field Name (Length)	Reference
1 thru 38	Field as on Primary	
39	Continuation Record No. (1)	5.16
40	Application Type (1)	5.91
41	Start/End Indicator (1)	5.152
42 thru 52	Start/End Date (11)	5.153
53 thru 74	Blank (Spacing) (22)	
75 thru 78	Route Distance (4)	5.27
79 thru 123	Reserved (Expansion) (45)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.9.4 Airport SID/STAR Flight Planning Continuation Records

c-14 This Continuation Record is used to indicate the fields of the Primary Record that are changed. Used in conjunction with Section 4.1.9.3.

c-1

Column	Field Name (Length)	Reference
1 thru 38	Fields as on Primary	
39	Continuation Record No. (1)	5.16
40 thru 123	Fields as on Primary Records	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.10 Runway Records (PG)

This file contains runway information.

4.1.10.1 Runway Primary Records

c-13, c-14, c-14, c-13

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (spacing) (1)	
7 thru 10	Airport ICAO Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5.14
13	Subsection Code (1)	5.5
14 thru 18	Runway Identifier (5)	5.46
19 thru 21	Blank (spacing) (3)	
22	Continuation Record No. (1)	5.16
23 thru 27	Runway Length (5)	5.57
28 thru 31	Runway Magnetic Bearing (4)	5.58
32	Blank (spacing) (1)	
33 thru 41	Runway Latitude (9)	5.36
42 thru 51	Runway Longitude (10)	5.37
52 thru 56	Runway Gradient (5)	5.212
57 thru 66	Blank (spacing) (10)	
67 thru 71	Landing Threshold Elevation (5)	5.68
72 thru 75	Displaced Threshold Distance (4)	5.69
76 thru 77	Threshold Crossing Height (2)	5.67
78 thru 80	Runway Width (3)	5.109
81	Blank (spacing) (1)	
82 thru 85	Localizer/MLS/ GLS Ref Path Identifier (4)	5.44
86	Localizer/ MLS/ GLS Category/ Class (1)	5.80
87 thru 90	Stopway (4)	5.79
91 thru 94	Second Localizer/ MLS/ GLS Ref Path Ident (4)	5.44
95	Second Localizer/ MLS/ GLS Category/ Class (1)	5.80
96 thru 101	Reserved (Expansion) (6)	
102 thru 123	Runway Description (22)	5.59
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.10.2 Runway Continuation Records

c-1

Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23	Reserved (Spacing) (1)	
24 thru 92	Notes (69)	5.61
93 thru 123	Reserved (Expansion) (31)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note: Column 23 is reserved for an application code character.

4.1.10.3 Runway Simulation Continuation Records

c-4

Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23	Application Type (1)	5.91
24 thru 51	Reserved (Spacing) (28)	
52 thru 56	Runway True Bearing (5)	5.94
57	True Bearing Source (1)	5.95
58 thru 65	Reserved (Spacing) (8)	
66	TDZE Location (1)	5.98
67 thru 71	Touchdown Zone Elevation (5)	5.97
72 thru 123	Reserved (Expansion) (52)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.11 Airport and Heliport Localizer and Glide Slope Records (PI)

This file will contain a sequential listing of all localizers and glide slopes associated with those localizers. The glide slope portion of the record may contain blanks if no glide slope is associated with the localizer (Category 0 localizer, see Section 5.80). When a glide slope is installed, a glide slope angle will be provided. The latitude and longitude fields for the glide slope may be set to blanks when such information is not available to the data supplier for a particular glide slope installation due to insufficient government source. c-10

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.11.1 Airport and Heliport Localizer and Glide Slope Primary Records

Column	Field Name (Length)	Reference	
1	Record Type (1)	5.2	
2 thru 4	Customer/Area Code (3)	5.3	c-5
5	Section Code (1)	5.4	
6	Blank (Spacing) (1)		
7 thru 10	Airport Identifier (4)	5.6	
11 thru 12	ICAO Code (2)	5.14	
13	Subsection Code (1)	5.5	
14 thru 17	Localizer Identifier (4)	5.44	
18	ILS Category (1)	5.80	
19 thru 21	Blank (Spacing) (3)		
22	Continuation Record No. (1)	5.16	
23 thru 27	Localizer Frequency (5)	5.45	
28 thru 32	Runway Identifier (5)	5.46	
33 thru 41	Localizer Latitude (9)	5.36	
42 thru 51	Localizer Longitude (10)	5.37	c-1
52 thru 55	Localizer Bearing (4)	5.47	
56 thru 64	Glide Slope Latitude (9)	5.36	
65 thru 74	Glide Slope Longitude (10)	5.37	
75 thru 78	Localizer Position (4)	5.48	
79	Localizer Position Reference (1)	5.49	
80 thru 83	Glide Slope Position (4)	5.50	
84 thru 87	Localizer Width (4)	5.51	
88 thru 90	Glide Slope Angle (3)	5.52	
91 thru 95	Station Declination (5)	5.66	
96 thru 97	Glide Slope Height at Landing Threshold (2)	5.67	
98 thru 102	Glide Slope Elevation (5)	5.74	
103 thru 123	Reserved (Expansion) (21)		
124 thru 128	File Record No. (5)	5.31	
129 thru 132	Cycle Date (4)	5.32	

4.1.11.2 Airport and Heliport Localizer and Glide Slope Continuation Records

Column	Field Name (Length)	Reference	
1 thru 21	Fields as on Primary Records		
22	Continuation Record No. (1)	5.16	
23	Reserved (Spacing) (1)		
24 thru 92	Notes (69)	5.61	c-10
93 thru 123	Reserved (Expansion) (31)		
124 thru 128	File Record No. (5)	5.31	
129 thru 132	Cycle Date (4)	5.32	

Note: (1) Column 23 is reserved for an application code character.

4.1.11.3 Airport and Heliport Localizer and Glide Slope Simulation Continuation Records

Column	Field Name (Length)	Reference	
1 thru 21	Fields as on Primary Record		
22	Continuation Record No. (1)	5.16	
23	Application Type (1)	5.91	
24 thru 27	Blank (spacing) (4)		
28 thru 32	Facility Characteristics (5)	5.93	
33 thru 51	Blank (spacing) (19)		c-4
52 thru 56	Localizer True Bearing (5)	5.94	
57	Localizer Bearing Source (1)	5.95	
58 thru 87	Reserved (spacing) (30)		
88 thru 90	Glide Slope Beam Width (3)	5.96	
91 thru 96	Approach Route Ident (6)	5.10	c-12
97 thru 102	Approach Route Ident (6)	5.10	
103 thru 108	Approach Route Ident (6)	5.10	
109 thru 114	Approach Route Ident (6)	5.10	
115 thru 120	Approach Route Ident (6)	5.10	
120 thru 123	Blank (spacing) (4)		
124 thru 128	File Record No. (5)	5.31	
129 thru 132	Cycle Date (4)	5.32	

4.1.12 Company Route Records (R)

This file contains company tailored route information.

4.1.12.1 Company Primary Records

Column	Field Name (Length)	Reference	
1	Record Type (1)	5.2	
2 thru 4	Customer (3)	5.3	c-5
5	Section Code (1)	5.4	
6	Subsection Code (1)	5.5	
7 thru 11	From Airport/Fix (5)	5.75	c-8
12	Blank (Spacing) (1)		
13 thru 14	ICAO Code (2)	5.14	
15	Section Code (1)	5.4	c-5
16	Subsection Code (1)	5.5	
17 thru 21	To Airport/Fix (5)	5.75	
22	Blank (Spacing) (1)		c-8
23 thru 24	ICAO Code (2)	5.14	
25	Section Code (1)	5.4	
26	Subsection Code (1)	5.5	
27 thru 36	Company Route ID (10)	5.76	c-3
37 thru 39	Sequence No. (3)	5.12	
40 thru 42	Via (3)	5.77	
43 thru 48	SID/STAR/App/Awy (6)	5.78	
49 thru 51	Area Code (3)	5.3	
52 thru 57	To Fix (6)	5.83	
58 thru 59	ICAO Code (2)	5.14	
60	Section Code (1)	5.4	
61	Subsection Code (1)	5.5	
62 thru 66	Runway Trans (5)	5.84	
67 thru 71	ENRT Trans (5)	5.85	
72	Reserved (1)		
73 thru 77	Cruise Altitude (5)	5.86	
78 thru 81	Terminal/Alternate Airport (4)	5.87	c-8
82 thru 83	ICAO Code (2)	5.14	
84 thru 87	Alternate Distance (4)	5.88	
88 thru 90	Cost Index (3)	5.89	
91 thru 94	Enroute Alternate Airport (4)	5.148	c-5
95 thru 123	Reserved (Expansion) (29)		
124 thru 128	File Record No. (5)	5.31	
129 thru 132	Cycle Date (4)	5.32	

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.13 Airport and Heliport Localizer Marker Records (PM)

c-10 The Airport and Heliport Localizer Marker File (PM) contains details of all markers and locators associated with all types of localizers. It does not contain airway
c-14 markers, see Section 4.1.15.

4.1.13.1 Airport and Heliport Localizer Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (Spacing) (1)	
7 thru 10	Airport Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5.14
13	Subsection Code (1)	5.5
14 thru 17	Localizer Identifier (4)	5.44
18 thru 20	Marker Type (3)	5.99
21	Blank (Spacing) (1)	
22	Continuation Record No. (1)	5.16
23 thru 27	Locator Frequency (5)	5.34
28 thru 32	Runway Identifier (5)	5.46
33 thru 41	Marker Latitude (9)	5.36
42 thru 51	Marker Longitude (10)	5.37
52 thru 55	Minor Axis Bearing (4)	5.100
56 thru 64	Locator Latitude (9)	5.36
65 thru 74	Locator Longitude (10)	5.37
75 thru 79	Locator Class (5)	5.35
80 thru 84	Locator Facility Characteristics (5)	5.93
85 thru 88	Locator Identifier (4)	5.33
89 thru 90	Blank (Spacing) (2)	
91 thru 95	Magnetic Variation (5)	5.39
96 thru 97	Blank (Spacing) (2)	
98 thru 102	Facility Elevation (5)	5.92
103 thru 123	Reserved (Expansion) (31)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.14 Airport Communications Records (PV)

4.14.1 Airport Communications Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (Spacing) (1)	
7 thru 10	Airport Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5.14
13	Subsection Code (1)	5.5
14 thru 16	Communications Type (3)	5.101
17 thru 23	Communications Freq (7)	5.103
24	Guard/Transmit (1)	5.182
25	Frequency Units (1)	5.104
26	Continuation Record No. (1)	5.16
27 thru 29	Service Indicator (3)	5.106
30	Radar Service (1)	5.102
31	Modulation (1)	5.198
32	Signal Emission (1)	5.199
33 thru 41	Latitude (9)	5.36
42 thru 51	Longitude (10)	5.37
52 thru 56	Magnetic Variation (5)	5.39
57 thru 61	Facility Elevation (5)	5.92
62	H24 Indicator (1)	5.181
63 thru 68	Sectorization (6)	5.183
69	Altitude Description (1)	5.29
70 thru 74	Communication Altitude (5)	5.184
75 thru 79	Communication Altitude (5)	5.184
80 thru 83	Sector Facility (4)	5.185
84 thru 85	ICAO Code (2)	5.14
86	Section Code (1)	5.4
87	Subsection Code (1)	5.5
88	Distance Description (1)	5.187
89 thru 90	Communications Distance (2)	5.188
91 thru 94	Remote Facility (4)	5.200
95 thru 96	ICAO Code (2)	5.14
97	Section Code (1)	5.4
98	Subsection Code (1)	5.5
99 thru 123	Call Sign (25)	5.105
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.14.2 Airport Communications Continuation Records

Column	Field Name (Length)	Reference
1 thru 25	Fields as on Primary Records	
26	Continuation Record No. (1)	5.16
27	Reserved Spacing (1)	
28 thru 87	Narrative (60)	5.186
88 thru 123	Reserved (Expansion) (36)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.14.3 Airport Additional Continuation Records

Column	Field Name (Length)	Reference
1 thru 25	Fields as on Primary Records	
26	Continuation Record No. (1)	5.16
27	Blank (Spacing) (14)	
28	Time Code (1)	5.131
29	NOTAM (1)	5.132
30	Time Indicator (1)	5.138
31 thru 40	Time of Operation (10)	5.195
41 thru 50	Time of Operation (10)	5.195
51 thru 60	Time of Operation (10)	5.195
61 thru 70	Time of Operation (10)	5.195
71 thru 80	Time of Operation (10)	5.195
81 thru 90	Time of Operation (10)	5.195
91 thru 100	Time of Operation (10)	5.195
101 thru 123	Reserved (Expansion) (23)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

c-9

4.1.15 Airways Marker Records (EM)

c-4

The Airways Marker file contains details of all airways markers.

4.1.15.1 Airways Marker Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 13	Blank (Spacing) (7)	
14 thru 17	Marker Identifier (4)	5.110
18 thru 19	Blank (Spacing) (2)	
20 thru 21	ICAO Code (2)	5.14
22	Continuation Record No. (1)	5.16
23 thru 26	Marker Code (4)	5.111
27	Reserved (Expansion) (1)	
28	Marker Shape (1)	5.112
29	Marker Power (1)	5.113
30 thru 32	Blank (Spacing) (2)	
33 thru 41	Marker Latitude (9)	5.36
42 thru 51	Marker Longitude (10)	5.37
52 thru 55	Minor Axis (4)	5.100
56 thru 74	Blank (Spacing) (19)	
75 thru 79	Magnetic Variation (5)	5.39
80 thru 84	Facility Elevation (5)	5.92
85 thru 87	Datum Code (3)	5.197
88 thru 93	Blank (Spacing) (6)	
94 thru 123	Marker Name (30)	5.71
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

c-10
c-10
c-6
c-10
c-4

4.1.16 Cruising Tables Records (TC)

c-5

The Cruising Tables file contains details relating to available Cruising Levels for IFR flights.

4.1.16.1 Cruising Table Primary Records

c-5

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Blank (Spacing) (3)	
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 8	Cruise Table Identifier (2)	5.134
9	Sequence Number (1)	5.12
10 thru 28	Blank (Spacing) (19)	
29 thru 32	Course From (4)	5.135
33 thru 36	Course To (4)	5.135
37	Mag/True (1)	5.165
38 thru 39	Blank (Spacing) (2)	
40 thru 44	Cruise Level From (5)	5.136
45 thru 49	Vertical Separation (5)	5.137
50 thru 54	Cruise Level To (5)	5.136
55 thru 59	Cruise Level From (5)	5.136
60 thru 64	Vertical Separation (5)	5.137
65 thru 69	Cruise Level To (5)	5.136
70 thru 74	Cruise Level From (5)	5.136
75 thru 79	Vertical Separation (5)	5.137
80 thru 84	Cruise Level To (5)	5.136
85 thru 89	Cruise Level From (5)	5.136
90 thru 94	Vertical Separation (5)	5.137
95 thru 99	Cruise Level To (5)	5.136
100 thru 123	Reserved (Expansion) (24)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

c-7
c-5

4.1.17 FIR/UIR Records (UF)

The FIR/UIR file contains the lateral boundary description of the FIR/UIR in a sequence of records and the vertical boundary description of the FIR/UIR in the first of the sequence. c-10

4.1.17.1 FIR/UIR Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 10	FIR/UIR Identifier (4)	5.116
11 thru 14	FIR/UIR Address (4)	5.151
15	FIR/UIR Indicator (1)	5.117
16 thru 19	Sequence Number (4)	5.12
20	Continuation Record No. (1)	5.16
21 thru 24	Adjacent FIR Identifier (4)	5.116
25 thru 28	Adjacent UIR Identifier (4)	5.116
29	Reporting Units Speed (1)	5.122
30	Reporting Units Altitude (1)	5.123
31	Entry Report (1)	5.124
32	Blank (Spacing) (1)	
33 thru 34	Boundary Via (2)	5.118
35 thru 43	FIR/UIR Latitude (9)	5.36
44 thru 53	FIR/UIR Longitude (10)	5.37
54 thru 62	Arc Origin Latitude (9)	5.36
63 thru 72	Arc Origin Longitude (10)	5.37
73 thru 76	Arc Distance (4)	5.119
77 thru 80	Arc Bearing (4)	5.120
81 thru 85	FIR Upper Limit (5)	5.121
86 thru 90	UIR Lower Limit (5)	5.121
91 thru 95	UIR Upper Limit (5)	5.121
96 thru 97	Cruise Table Ind (2)	5.134
98	Reserved (Expansion) (1)	
99 thru 123	FIR/UIR Name (25)	5.125
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

c-9

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.18 Restrictive Airspace Records (UR)

The Restrictive Airspace Record File contains a sequential listing of vertical and lateral limits of restrictive areas.

4.1.18.1 Restrictive Airspace Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 8	ICAO Code (2)	5.14
9	Restrictive Type (1)	5.128
10 thru 19	Restrictive Airspace Designation (10)	5.129
20	Multiple Code (1)	5.130
21 thru 24	Sequence Number (4)	5.12
25	Continuation Record No. (1)	5.16
26	Level (1)	5.19
27	Time Code (1)	5.131
28	NOTAM (1)	5.132
29 thru 30	Blank (Spacing) (2)	
31 thru 32	Boundary Via (2)	5.118
33 thru 41	Latitude (9)	5.36
42 thru 51	Longitude (10)	5.37
52 thru 60	Arc Origin Latitude (9)	5.36
61 thru 70	Arc Origin Longitude (10)	5.37
71 thru 74	Arc Distance (4)	5.119
75 thru 78	Arc Bearing (4)	5.120
79 thru 81	Blank (Spacing) (3)	
82 thru 86	Lower Limit (5)	5.121
87	Unit Indicator (1)	5.133
88 thru 92	Upper Limit (5)	5.121
93	Unit Indicator (1)	5.133
94 thru 123	Restrictive Airspace Name (30)	5.126
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.18.2 Restrictive Airspace Continuation Records

Column	Field Name (Length)	Reference
1 thru 24	Fields as on Primary Records	
25	Continuation Record No. (1)	5.16
26	Time Code (1)	5.131
27	NOTAM (1)	5.132
28	Time Indicator (1)	5.138
29 thru 38	Time of Operation (10)	5.195
39 thru 48	Time of Operation (10)	5.195
49 thru 58	Time of Operation (10)	5.195
59 thru 68	Time of Operation (10)	5.195
69 thru 78	Time of Operation (10)	5.195
79 thru 88	Time of Operation (10)	5.195
89 thru 98	Time of Operation (10)	5.195
99 thru 123	Controlling Agency (25)	5.140
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.18.3 Restrictive Airpace Flight Planning Continuation Record

Column	Field Name (Length)	Reference
1 thru 24	Fields as on Primary Records	
25	Continuation Record No. (1)	5.16
26 thru 29	Blank (Spacing) (4)	
30	Start/End Indicator (1)	5.152
31 thru 41	Start/End Date (11)	5.153
42 thru 123	Reserved (Expansion) (82)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.19 Grid MORA Records (AS)

The Grid MORA Minimum Off Rate Altitude file contains a table of Minimum Off Route Altitudes.

4.1.19.1 Grid MORA Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Blank (Spacing) (3)	
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 13	Blank (Spacing) (7)	
14 thru 16	Starting Latitude (3)	5.141
17 thru 20	Starting Longitude (4)	5.142
21 thru 30	Blank (Spacing) (3)	
31 thru 33	MORA (3)	5.143
34 thru 36	MORA (3)	5.143
37 thru 39	MORA (3)	5.143
40 thru 42	MORA (3)	5.143
43 thru 45	MORA (3)	5.143
46 thru 48	MORA (3)	5.143
49 thru 51	MORA (3)	5.143
52 thru 54	MORA (3)	5.143
55 thru 57	MORA (3)	5.143
58 thru 60	MORA (3)	5.143
61 thru 63	MORA (3)	5.143
64 thru 66	MORA (3)	5.143
67 thru 69	MORA (3)	5.143
70 thru 72	MORA (3)	5.143
73 thru 75	MORA (3)	5.143
76 thru 78	MORA (3)	5.143
79 thru 81	MORA (3)	5.143
82 thru 84	MORA (3)	5.143
85 thru 87	MORA (3)	5.143
88 thru 90	MORA (3)	5.143
91 thru 93	MORA (3)	5.143
94 thru 96	MORA (3)	5.143
97 thru 99	MORA (3)	5.143
100 thru 102	MORA (3)	5.143
103 thru 105	MORA (3)	5.143
106 thru 108	MORA (3)	5.143
109 thru 111	MORA (3)	5.143
112 thru 114	MORA (3)	5.143
115 thru 117	MORA (3)	5.143
118 thru 120	MORA (3)	5.143
121 thru 123	Reserved (Expansion) (3)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.20 Airport MSA (Minimum Sector Altitude) Records (PS)

c-5

The Minimum Sector Altitude (MSA) file contains details relating to available sector altitudes.

4.1.20.1 Airport MSA Primary Records

	Column	Field Name (Length)	Reference
	1	Record Type (1)	5.2
	2 thru 4	Customer/Area Code (3)	5.3
	5	Section Code (1)	5.4
	6	Blank (Spacing) (1)	
	7 thru 10	Airport Identifier (4)	5.6
	11 thru 12	ICAO Code (2)	5.14
	13	Subsection Code (1)	5.5
	14 thru 18	MSA Center (5)	5.144
	19 thru 20	ICAO Code (2)	5.14
	21	Section Code (1)	5.4
	22	Subsection Code (1)	5.5
	23	Multiple Code (1)	5.130
	24 thru 38	Reserved (Expansion) (15)	
	39	Continuation Record No. (1)	5.16
	40	Reserved (Spacing) (1)	
	41 thru 42	Radius Limit (2)	5.145
	43 thru 45	Sector Bearing (3)	5.146
	46 thru 48	Sector Altitude (3)	5.147
	49 thru 51	Sector Bearing (3)	5.146
	52 thru 54	Sector Altitude (3)	5.147
	55 thru 57	Sector Bearing (3)	5.146
	58 thru 60	Sector Altitude (3)	5.147
	61 thru 63	Sector Bearing (3)	5.146
	64 thru 66	Sector Altitude (3)	5.147
c-10	67 thru 69	Sector Bearing (3)	5.146
	70 thru 72	Sector Altitude (3)	5.147
	73	Magnetic/True Ind (1)	5.165
c-12	74 thru 123	Reserved (Expansion) (50)	
	124 thru 128	File Record No. (5)	5.31
	129 thru 132	Cycle Date (4)	5.32

4.1.20.2 Airport MSA Continuation Records

	Column	Field Name (Length)	Reference
	1 thru 38	Field as on Primary Records	
c-7	39	Continuation Record No. (1)	5.16
	40	Reserved (Spacing) (1)	
	41 thru 109	Notes (69)	5.61
	110 thru 123	Reserved (Expansion) (14)	
	124 thru 128	File Record No. (5)	5.31
	129 thru 132	Cycle Date (4)	5.32

c-6 4.1.21 Enroute Airways Restriction Records (EU)

c-10 The Enroute Airway Restriction file will contain altitude nd time restrictions for an airway, airway segment or sequence of airway segments. The Enroute Airway Restriction file may contain four different types of primary records, dependent on the type of restriction. A Restriction Code will identify the type of restriction contained in the record. Continuation Records may be used if a single record does not provide sufficient space for coding a single, complete restriction.

4.1.21.1 Altitude Exclusion Primary Records c-6

Column	Field Name (Length)	Reference	
1	Record Type (1)	5.2	
2 thru 4	Customer/Area Code (3)	5.3	
5	Section Code (1)	5.4	c-10
6	Subsection Code (1)	5.5	
7 thru 11	Route Identifier (5)	5.8	
12	Reserved (1)	Note 1	
13 thru 15	Restriction Identifier (3)	5.154	
16 thru 17	Restriction Type (2)	5.201	
18	Continuation Record No. (1)	5.16	
19 thru 23	Start Fix Identifier (5)	5.13	
24 thru 25	Start Fix ICAO Code (2)	5.14	
26	Start Fix Section Code (1)	5.4	
27	Start Fix Subsection Code(1)	5.5	
28 thru 32	End Fix Identifier (5)	5.13	
33 thru 34	End Fix ICAO Code (2)	5.14	
35	End Fix Section Code (1)	5.4	
36	End Fix Subsection Code (1)	5.5	
37	Blank (Spacing) (1)		
38 thru 44	Start Date (7)	5.157	
45 thru 51	End Date (7)	5.157	
52	Time Code (1)	5.131	
53	Time Indicator (1)	5.138	
54 thru 63	Time of Operation (10)	5.195	
64 thru 73	Time of Operation (10)	5.195	
74 thru 83	Time of Operation (10)	5.195	
84 thru 93	Time of Operation (10)	5.195	c-12
94	Exclusion Indicator (1)	5.202	
95	Units of Altitude (1)	5.160	
96 thru 98	Restriction Altitude (3)	5.161	
99	Block Indicator (1)	5.203	
100 thru 102	Restriction Altitude (3)	5.161	
103	Block Indicator (1)	5.203	
104 thru 106	Restriction Altitude (3)	5.161	
107	Block Indicator (1)	5.203	
108 thru 110	Restriction Altitude (3)	5.161	
111	Block Indicator (1)	5.203	
112 thru 114	Restriction Altitude (3)	5.161	
115	Block Indicator (1)	5.203	
116 thru 118	Restriction Altitude (3)	5.161	
119	Block Indicator (1)	5.203	
120 thru 122	Restriction Altitude (3)	5.161	
123	Blank (Spacing) (1)		
124 thru 128	File Record Number (5)	5.31	
129 thru 132	Cycle Date (4)	5.32	

Note 1: The standard length for the Route Identifier is five characters. Some users envisage the need for six-character field. This reserved column will permit this usage.

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.21.2 Altitude Exclusion Continuation Records

Column	Field Name (Length)	Reference	
1 thru 17	Fields as on Primary Records		
18	Continuation Record No. (1)	5.16	
19 thru 51	Reserved (Expansion) (33)		
52	Time Code (1)	5.131	
53	Time Indicator (1)	5.138	
54 thru 63	Time of Operation (10)	5.195	
64 thru 73	Time of Operation (10)	5.195	
74 thru 83	Time of Operation (10)	5.195	
84 thru 93	Time of Operation (10)	5.195	
94	Exclusion Indicator (1)	5.202	c-12
95	Units of Altitude (1)	5.160	
96 thru 98	Restriction Altitude (3)	5.161	c-11
99	Block Indicator (1)	5.203	
100 thru 102	Restriction Altitude (3)	5.161	
103	Block Indicator (1)	5.203	
104 thru 106	Restriction Altitude (3)	5.161	c-12
107	Block Indicator (1)	5.203	
108 thru 110	Restriction Altitude (3)	5.161	
111	Block Indicator (1)	5.203	
112 thru 114	Restriction Altitude (3)	5.161	
115	Block Indicator (1)	5.203	
116 thru 118	Restriction Altitude (3)	5.161	
119	Block Indicator (1)	5.203	
120 thru 122	Restriction Altitude (3)	5.161	
123	Blank (Spacing) (1)		
124 thru 128	File Record No. (5)	5.31	
129 thru 132	Cycle Date (5)	5.32	

4.1.21A.1 Note Restriction Primary Records

Column	Field Name (Length)	Reference	
1	Record Type (1_	5.2	
2 thru 4	Customer/Area Code (3)	5.3	
5	Section Code (1)	5.4	
6	Subsection Code (1)	5.5	
7 thru 11	Route Identifier (5)	5.8	
12	Reserved (1)	Note 1	
13 thru 15	Restriction Identifier (3)	5.154	
16 thru 17	Restriction Type (2)	5.201	
18	Continuation Record No. (1)	5.16	
19 thru 23	Start Fix Identifier (5)	5.13	
24 thru 25	Start Fix ICAO Code (2)	5.14	c-11
26	Start Fix Section Code (1)	5.4	
27	Start Fix Subsection Code (1)	5.5	
28 thru 32	End Fix Identifier (5)	5.13	
33 thru 34	End Fix ICAO Code (2)	5.14	
35	End Fix Section Code (1)	5.4	
36	End Fix Subsection Code (1)	5.5	
37	Blank (Spacing) (1)		
38 thru 44	Start Date (7)	5.157	
45 thru 51	End Date (7)	5.157	
52 thru 120	Restriction Notes (69)	5.163	
121 thru 123	Blank (Spacing) (3)		
124 thru 128	File Record Number (5)	5.31	
129 thru 132	Cycle Date (4)	5.21	

4.1.21A.2 Note Restriction Continuation Records

Column	Field Name (Length)	Reference	
1 thru 17	Fields as on Primary Records		
18	Continuation Record No. (1)	5.16	
19 thru 51	Reserved (Expansion) (33)		c-11
52 thru 120	Restriction Notes (69)	5.163	
121 thru 123	Blank (Spacing) (3)		
124 thru 128	File Record Number (5)	5.31	
129 thru 132	Cycle Date (4)	5.32	

4.1.21B.1 Seasonal Closure Primary Records

Column	Field Name (Length)	Reference	
1	Record Type (1)	5.2	
2 thru 4	Customer/Area Code (3)	5.3	
5	Section Code (1)	5.4	
6	Subsection Code (1)	5.5	
7 thru 11	Route Identifier (5)	5.8	
12	Reserved (1)	Note 1	
13 thru 15	Restriction Identifier (3)	5.154	
16 thru 17	Restriction Type (2)	5.201	c-12
18	Continuation Record No. (1)	5.16	
19 thru 23	Start Fix Identifier (5)	5.13	
24 thru 25	Start Fix ICAO Code (2)	5.14	
26	Start Fix Section Code (1)	5.4	
27	Start Fix Subsection Code (1)	5.5	
28 thru 32	End Fix Identifier (5)		
33 thru 34	End Fix ICAO Code (2)	5.13	
35	End Fix Section Code (1)	5.14	
36	End Fix Subsection Code (1)	5.4	
37	Blank (Spacing) (1)	5.5	
38 thru 44	Start Date (7)	5.157	
45 thru 51	End Date (7)	5.157	
52	Time Code (1)	5.131	
53	Time Indicator (1)	5.138	
54 thru 63	Time of Operation (10)	5.195	
64 thru 73	Time of Operation (10)	5.195	
74 thru 83	Time of Operation (10)	5.195	
84 thru 93	Time of Operation (10)	5.195	
94 thru 95	Cruise Table Ident (2)	5.134	
96 thru 123	Blank (Spacing) (28)		
124 thru 128	File Record Number (5)	5.31	
129 thru 132	Cycle Date (4)	5.32	

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.21C.1 Cruising Table Replacement Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 11	Route Identifier (5)	5.8
12	Reserved (1)	Note 1
13 thru 15	Restriction Identifier (3)	5.154
16 thru 17	Restriction Type (2)	5.201
18	Continuation Record No. (1)	5.16
19 thru 23	Start Fix Identifier (5)	5.13
24 thru 25	Start Fix ICAO Code (2)	5.14
26	Start Fix Section Code (1)	5.4
27	Start Fix Subsection Code (1)	5.5
28 thru 32	End Fix Identifier (5)	
33 thru 34	End Fix ICAO Code (2)	5.13
35	End Fix Section Code (1)	5.14
36	End Fix Subsection Code (1)	5.4
37	Blank (Spacing) (1)	5.5
38 thru 44	Start Date (7)	5.157
45 thru 51	End Date (7)	5.157
52	Time Code (1)	5.131
53	Time Indicator (1)	5.138
54 thru 63	Time of Operation (10)	5.195
64 thru 73	Time of Operation (10)	5.195
74 thru 83	Time of Operation (10)	5.195
84 thru 93	Time of Operation (10)	5.195
94 thru 95	Cruise Table Ident (2)	5.134
96 thru 123	Blank (Spacing) (28)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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4.1.21C.2 Cruising Table Replacement Continuation Records

Column	Field Name (Length)	Reference
1 thru 17	Fields as on Primary Records	
18	Continuation Record No. (1)	5.16
19 thru 51	Reserved (Expansion) (33)	
52	Time Code (1)	5.131
53	Time Indicator (1)	5.138
54 thru 63	Time of Operation (10)	5.195
64 thru 73	Time of Operation (10)	5.195
74 thru 83	Time of Operation (10)	5.195
84 thru 93	Time of Operation (10)	5.195
94 thru 95	Cruise Table Ident (2)	5.134
96 thru 123	Blank (Spacing) (28)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.22 Airport and Heliport MLS (Azimuth, Elevation and Back Azimuth) Records

c-14

This file will contain a listing of all Microwave Landing Systems, including the Azimuth station, the Elevation station and the Back Azimuth station if installed.

4.1.22.1 Airport and Heliport MLS Primary Records

c-14

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (Spacing) (1)	
7 thru 10	Airport Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5 14
13	Subsection Code (1)	5.5
14 thru 17	MLS Identifier (4)	5.44
18	MLS Category (1)	5.80
19 thru 21	Blank (Spacing) (3)	
22	Continuation Record No. (1)	5.16
23 thru 25	Channel (3)	5.166
26 thru 27	Blank (Spacing) (2)	
28 thru 32	Runway Identifier (5)	5.46
33 thru 41	Azimuth Latitude (9)	5.36
42 thru 51	Azimuth Longitude (10)	5.37
52 thru 55	Azimuth Bearing (4)	5.167
56 thru 64	Elevation Latitude (9)	5.36
65 thru 74	Elevation Longitude (10)	5.37
75 thru 78	Azimuth Position (4)	5.48
79	Azimuth Position Reference (1)	5.49
80 thru 83	Elevation Position (4)	5.50
84 thru 86	Azimuth Proportional Angle Right (3)	5.168
87 thru 89	Azimuth Proportional Angle Left (3)	5.168
90 thru 92	Azimuth Coverage Right (3)	5.172
93 thru 95	Azimuth Coverage Left (3)	5.172
96 thru 98	Elevation Angle Span (3)	5.169
99 thru 103	Magnetic Variation (5)	5.39
104 thru 108	EL Elevation (5)	5.74
109 thru 112	Nominal Elevation Angle (4)	5.173
113 thru 115	Minimum Glide Path Angle (3)	5.52
116 thru 123	Reserved(Expansion) (8)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.22.2 Airport and Heliport MLS Continuation Records

c-7

Column	Field Name (Length)	Reference
1 thru 21	Field as on Primary Records	
22	Continuation Record No. (1)	5.16
23 thru 27	Blank (Spacing) (5)	
28 thru 32	Facility Characteristics (5)	5.93
33 thru 41	Back Azimuth Latitude (9)	5.36
42 thru 51	Back Azimuth Longitude (10)	5.37
52 thru 55	Back Azimuth Bearing (4)	5.167
56 thru 64	MLS Datum Point Latitude (9)	5.36
65 thru 74	MLS Datum Point Longitude (10)	5.37
75 thru 78	Back Azimuth Position (4)	5.48
79	Back Azimuth Position Reference (1)	5.49
80 thru 83	Blank (Spacing) (4)	
84 thru 86	Back Azimuth Proportional Sector Right (3)	5.168
87 thru 89	Back Azimuth Proportional Sector Left (3)	5.168
90 thru 92	Back Azimuth Coverage Right (3)	5.172
93 thru 95	Back Azimuth Coverage Left (3)	5.172
96 thru 100	Back Azimuth True Bearing (5)	5.94
101	Back Azimuth Bearing Source (1)	5.95
102 thru 106	Azimuth True Bearing (5)	5.94
107	Azimuth Bearing Source (1)	5.95
108 thru 109	Glide Path Height at Landing Threshold (2)	5.67
110 thru 123	Reserved (Expansion) (14)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.23 Enroute Communications Records (EV)

4.1.23.1 Enroute Communications Primary Records

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Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 10	FIR/RDO Ident (4)	5.190
11 thru 14	FIR/UIR Address (4)	5.151
15	Indicator (1)	5.117
16 thru 18	Reserved (Expansion) (3)	
19 thru 43	Remote Name (25)	5.189
44 thru 46	Communications Type (3)	5.101
47 thru 53	Comm Frequency (7)	5.103
54	Guard/Transmit (1)	5.182
55	Frequency Units (1)	5.104
56	Continuation Record No. (1)	5.16
57 thru 59	Service Indicator (3)	5.106
60	Radar Service (1)	5.102
61	Modulation (1)	5.198
62	Signal Emission (1)	5.199
63 thru 71	Latitude (9)	5.36
72 thru 81	Longitude (10)	5.37
82 thru 86	Magnetic Variation (5)	5.39
87 thru 91	Facility Elevation (5)	5.92
92	H24 Indicator (1)	5.181
93	Altitude Descript. (1)	5.29
94 thru 98	Communication Altitude (5)	5.184
99 thru 103	Communication Altitude (5)	5.184
104 thru 107	Remote Facility (4)	5.200
108 thru 109	ICAO Code (2)	5.14
110	Section Code (1)	5.4
111	Subsection Code (1)	5.5
112 thru 123	Reserved (Expansion) (12)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.23.2 Enroute Communications Continuation Records

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Column	Field Name (Length)	Reference
1 thru 55	Fields as on Primary Records	
56	Continuation Record No. (1)	5.16
57	Blank (Spacing) (1)	
58	Time Code (1)	5.131
59	NOTAM (1)	5.132
60	Time Indicator (1)	5.138
61 thru 70	Time of Operation (10)	5.195
71 thru 83	Reserved (Expansion) (23)	
84 thru 123	Call Sign (30)	5.105
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.23.3 Enroute Communications Continuation Records

Column	Field Name (Length)	Reference
1 thru 55	Fields as on Primary Records	
56	Continuation Record No. (1)	5.16
57 thru 60	Blank (Spacing) (4)	
61 thru 70	Time of Operation (10)	5.195
71 thru 80	Time of Operation (10)	5.195
81 thru 90	Time of Operation (10)	5.195
91 thru 100	Time of Operation (10)	5.195
101 thru 110	Time of Operation (10)	5.195
111 thru 120	Time of Operation (10)	5.195
121 thru 123	Reserved (Expansion) (3)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.24 Preferred Routes Records (ET)

The Preferred Routes file contains details defining the Preferred Routes, North America Routes for North Atlantic Traffic, the Traffic Orientation System, and the similar predefined routings that do not meet the requirements of the Enroute Airway Record. c-13

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

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4.1.24.1 Preferred Route Primary Records

Columns	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 13	Blank (spacing) (7)	
14 thru 23	Route Identifier (10)	5.8
24 thru 25	Preferred Route Use Ind (2)	5.220
26 thru 29	Sequence Number (4)	5.12
30 thru 38	Blank (spacing) (9)	
39	Continuation Record No. (1)	5.16
40 thru 44	To Fix Identifier (5)	5.83
45 thru 46	ICAO Code (2)	5.14
47	Section Code (1)	5.4
48	Subsection Code (1)	5.5
49 thru 51	VIA Code (3)	5.77
52 thru 57	SID/STAR/AWY Ident (6) (See Note 1)	5.78
58 thru 60	AREA Code (3)	5.3
61	Level (1)	5.19
62	Route Type (1)	5.7
63 thru 67	Initial Airport/Fix (5)	5.194
68 thru 69	ICAO Code (2)	5.14
70	Section Code (1)	5.4
71	Subsection Code (1)	5.5
72 thru 76	Terminus Airport/Fix (5)	5.194
77 thru 78	ICAO Code (2)	5.14
79	Section Code (1)	5.4
80	Subsection Code (1)	5.5
81 thru 85	Minimum Altitude (5)	5.30
86 thru 90	Maximum Altitude (5)	5.127
91	Time Code (1)	5.131
92 thru 93	Aircraft Use Group (2)	5.221
94	Direction Restriction (1)	5.115
95	Altitude Description (1)	5.29
96 thru 100	Altitude One (5)	5.30
101 thru 105	Altitude Two (5)	5.30
106 thru 123	Reserved (Expansion) (18)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note 1: The Standard Enroute Airway Identifier is five characters. Some users envision the need for a sixth character. This field length will permit such coding, see Section 5.8.

4.1.24.2 Preferred Route Continuation Records

Column	Field Name (Length)	Reference
1 thru 38	Fields as on Primary Records	
39	Continuation Record No. (1)	5.16
40	Reserved Spacing (1)	
41	Time Code (1)	5.131
42	Time Indicator	5.138
43 thru 52	Time of Operation (10)	5.195
53 thru 62	Time of Operation (10)	5.195
63 thru 72	Time of Operation (10)	5.195
73 thru 82	Time of Operation (10)	5.195
83 thru 92	Time of Operation (10)	5.195
93 thru 102	Time of Operation (10)	5.195
103 thru 112	Time of Operation (10)	5.195
113 thru 123	Reserved (Expansion) (11)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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4.1.24.3 Preferred Route Continuation Record (ET)

Columns	Field Name (Length)	Reference
1 thru 38	Fields as on Primary Records	
39	Continuation Record No. (1)	5.16
40	Reserved (spacing) (1)	
41 thru 109	Notes (69)	5.61
110 thru 123	Reserved (Expansion) (14)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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Note: Section 5.221 describes the use of this record for Aircraft Use Groups.

4.1.25 Controlled Airspace Records (UC)

c-13

The Controlled Airspace Record file contains a sequential listing of vertical and lateral limits of all types and classifications of Controlled Airspace. It includes Controlled Airspace associated with Airports and Heliports.

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4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.25.1 Controlled Airspace Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 8	ICAO Code (2)	5.14
9	Airspace Type (1)	5.213
10 thru 14	Airspace Center (5)	5.214
15	Section Code (1)	5.4
16	Subsection Code (1)	5.5
17	Airspace Classification (1)	5.215
18 thru 19	Reserved (spacing) (2)	
20	Multiple Code (1)	5.130
21 thru 24	Sequence Number (4)	5.12
25	Continuation Record Number (1)	5.16
26	Level (1)	5.19
27	Time Code (1)	5.131
28	NOTAM (1)	5.132
29 thru 30	Blank (spacing) (2)	
31 thru 32	Boundary Via	5.118
33 thru 41	Latitude (9)	5.36
42 thru 51	Longitude (10)	5.37
52 thru 60	Arc Origin Latitude (9)	5.36
61 thru 70	Arc Origin Longitude (10)	5.37
71 thru 74	Arc Distance (4)	5.119
75 thru 78	Arc Bearing (4)	5.120
79 thru 81	RNP (3)	5.211
82 thru 86	Lower Limit (5)	5.121
87	Unit Indicator (1)	5.133
88 thru 92	Upper Limit (50	5.121
93	Unit Indicator (1)	5.133
94 thru 123	Controlled Airspace Name (30)	5.216
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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4.1.25.2 Controlled Airspace Continuation Records

Column	Filed Name (Length)	Reference
1 thru 24	Fields as on Primary Records	
25	Continuation Record Number (1)	5.16
26	Time Code (1)	5.131
27	NOTAM (1)	5.132
28	Time Indicator (1)	5.138
29 thru 38	Time of Operations (10)	5.195
39 thru 48	Time of Operations (10)	5.195
49 thru 58	Time of Operations (10)	5.195
59 thru 68	Time of Operations (10)	5.195
69 thru 78	Time of Operations (10)	5.195
79 thru 88	Time of Operations (10)	5.195
89 thru 98	Time of Operations (10)	5.195
99 thru 123	Controlling Agency (25)	5.140
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.26 Geographical Reference Table Records (TG)

The Geographical Reference Table file contains information that permits the cross referencing of otherwise undefined geographical entities and Route Identifiers in the Preferred Route file. The contents are not standardized and may vary from data supplier to data supplier. The contents of such a file can only be used in conjunction with the Preferred Route file of the same database in which the file is presented.

4.1.26.1 Geographical Reference Table Primary Records (TG)

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 8	Geographical Ref Table ID (2)	5.218
9	Sequence Number (1)	5.12
10 thru 38	Geographical Entity (29)	5.219
39	Continuation Record No (1)	5.16
40	Reserved (1)	
41 thru 50	Preferred Route Ident (10)	5.8
51 thru 52	Preferred Route Use Ind (2)	5.220
53 thru 62	Preferred Route Ident (10)	5.8
63 thru 64	Preferred Route Use Ind (2)	5.220
65 thru 74	Preferred Route Ident (10)	5.8
75 thru 76	Preferred Route Use Indi (2)	5.220
77 thru 86	Preferred Route Ident (10)	5.8
87 thru 88	Preferred Route Use Indi (2)	5.220
89 thru 98	Preferred Route Ident (10)	5.8
99 thru 100	Preferred Route Use Indi (2)	5.220
101 thru 110	Preferred Route Ident (10)	5.8
111 thru 112	Preferred Route Use Indi (2)	5.220
113 thru 123	Blank (spacing) (11)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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4.1.27 Flight Planning Arrival/Departure Data Records (PR)

The Flight Planning Arrival/Departure Data Record is used to provide the sub-set of data defining SIDs (PD), STARs (PE) and Approach Procedures (PF) from paragraph 4.1.9 required for the computer generation of Flight Plans which include Terminal Procedures. The file contains a sequential listing of published Arrival Procedures, Approach Procedures and Departure Procedures, the available Enroute and Runway Transitions for those procedures, the Transition waypoints, the appropriate along track distance fields and the intermediate fixes along those routes.

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4.1.27.1 Primary Records

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Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (spacing) (1)	
7 thru 10	Airport Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5.14
13	Subsection Code (1)	5.5
14 thru 19	SID/STAR/Approach Identifier (6)	5.9, 5.10
20	Procedure Type (1)	5.230
21 thru 25	Runway Transition Identifier (5)	5.11
26 thru 30	Runway Transition Fix (5)	5.13
31 thru 32	ICAO Code (2)	5.14
33	Section Code (1)	5.4
34	Subsection Code (1)	5.5
35 thru 37	Runway Transition Along Track Distance (3)	5.231
38 thru 42	Common Segment Transition Fix (5)	5.13
43 thru 44	ICAO Code (2)	5.14
45	Section Code (1)	5.4
46	Subsection Code (1)	5.5
47 thru 49	Common Segment Along Track Distance (3)	5.231
50 thru 54	Enroute Transition Identifier (5)	5.11
55 thru 59	Enroute Transition Fix (5)	5.13
60 thru 61	ICAO Code (2)	5.14
62	Section Code (1)	5.4
63	Subsection Code (1)	5.5
64 thru 66	Enroute Transition Along Track Distance (3)	5.231
67 thru 69	Sequence Number (3)	5.12
70	Continuation Number (1)	5.16
71 thru 74	Number of Engines (4)	5.232
75	Turboprop/Jet Indicator (1)	5.233
76	RNAV Flag (1)	5.234
77	ATC Weight Category (1)	5.235
78 thru 84	ATC Identifier (7)	5.236
85	Time Code (1)	5.131
86 thru 100	Procedure Description (15)	5.237
101 thru 102	Leg Type Code (2)	5.238
103	Reporting Code (1)	5.239
104 thru 107	Initial Departure Magnetic Course (4)	5.26
108	Altitude Description (1)	5.29
109 thru 111	Altitude (3)	5.240
112 thru 114	Altitude (3)	5.240
115 thru 117	Speed Limit (3)	5.72
118 thru 119	Initial Cruise Table (2)	5.134
120 thru 123	Blank (spacing) (4)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.27.2 Continuation Records

This Flight Planning Arrival/Departure Data Continuation Record is provided when Intermediate Fix information is required for the procedure coded in the Primary Record.

Column	Field Name (Length)	Reference
1 thru 69	Fields as on Primary Records	
70	Continuation Number (1)	5.16
71	Application Number (1)	5.91
72 thru 76	Intermediate Fix Identifier (5)	5.13
77 thru 78	ICAO Code (2)	5.14
79	Section Code (1)	5.4
80	Subsection Code (1)	5.5
81 thru 83	Intermediate Distance (3)	5.231
84	Fix Related Transition Code (1)	5.241
85 thru 89	Intermediate Fix Identifier (5)	5.13
90 thru 91	ICAO Code (2)	5.14
92	Section Code (1)	5.4
93	Subsection Code (1)	5.5
94 thru 96	Intermediate Distance (3)	5.231
97	Fix Related Transition Code (1)	5.241
98 thru 102	Intermediate Fix Identifier (5)	5.13
103 thru 104	ICAO Code (2)	5.14
105	Section Code (1)	5.4
106	Subsection Code (1)	5.5
107 thru 109	Intermediate Distance (3)	5.231
110	Fix Related Transition Code (1)	5.241
111 thru 115	Intermediate Fix Identifier (5)	5.13
116 thru 117	ICAO Code (2)	5.14
118	Section Code (1)	5.4
119	Subsection Code (1)	5.5
120 thru 122	Intermediate Distance (3)	5.231
123	Fix Related Transition Code (1)	5.241
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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4.1.27.3 Continuation Records

Column	Field Name (Length)	Reference
1 thru 69	Fields as on Primary Records	
70	Continuation Number (1)	5.16
71	Application Type (1)	5.91
72	Time Code (1)	5.131
73	Time Indicator (1)	5.138
74 thru 83	Time of Operation (10)	5.195
84 thru 93	Time of Operation (10)	5.195
94 thru 103	Time of Operation (10)	5.195
104 thru 113	Time of Operation (10)	5.195
114 thru 123	Time of Operation (10)	5.195
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note: A Record 4.1.27.4 would carry Time of Operation in "note" form starting with column 74 and ending in column 123, where required.

4.1.28 Path Point Records (PP)

This file will contain Path Point records for RNAV GPS/GLS Approach Procedures.

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

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4.1.28.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (spacing) (1)	
7 thru 10	*Airport Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5.14
13	Subsection Code (1)	5.5
14 thru 19	*Approach Identifier (6)	5.10
20 thru 24	*Runway or Helipad Identifier (5)	5.46 or 5.180
25 thru 26	*Operation Type (2)	5.223
27	*Approach Indicator (1)	5.224
28 thru 38	Blank (spacing) (11)	
39	Continuation Number (1)	5.16
40 thru 48	*Landing Threshold Point Latitude (9)	5.36
49 thru 58	*Landing Threshold Point Longitude (10)	5.37
59 thru 64	*(LTP) WGS-84 Ellipsoid Height (6)	5.225
65 thru 66	*(FPCP) Threshold Crossing Height (2)	5.67
67	Blank (1)	
68 thru 71	*Glide Path Angle (4)	5.226
72 thru 80	*Flight Path Alignment Point Latitude (10)	5.36
81 thru 90	*Flight Path Alignment Point Longitude (10)	5.37
91 thru 96	(FPAP) WGS-84 Ellipsoid Height (6)	5.225
97 thru 102	(FPAP) Orthometric Height (6)	5.227
103 thru 108	(FPCP) Orthometric Height (6)	5.227
109	*Unit of Height (1)	5.228
110 thru 115	Blank (spacing) (6)	
116 thru 123	Path Point Data CRC (8)	5.229
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note: The pathpoint concept is currently being developed by the FAA in cooperation with industry and other governments. Most of the items in the pathpoint record have been finalized; however, many of the fields have not had final resolution and therefore care should be taken before creating software for implementation. The pathpoint record continues to be included in ARINC Specification 424 as a concept that will have changes as the concept is matured.

4.1.29 GLS Record (PT)

This record contains a sequential listing of all GNSS Landing Systems (GLS) approaches, including the slope, course and reference path idents of the GLS approach. A GLS approach is identified by its ident and channel. Note that several GLS approaches can be supported by a single differential GLS ground station.

4.1.29.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (1)	
7 thru 10	Airport or Heliport Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5.14
13	Subsection code (1)	5.5
14 thru 17	GLS Ref Path Identifier (4)	5.44
18	GLS Category (1)	5.80
19 thru 21	Blank (3)	
22	Continuation Number (1)	5.16
23 thru 27	GLS Channel (5)	5.244
28 thru 32	Runway Identifier (5)	5.46
33 thru 51	Blank (19)	
52 thru 55	GLS Approach Bearing (4) (Note 1)	5.47
56 thru 64	Station Latitude (9)	5.36
65 thru 74	Station Longitude (10)	5.37
75 thru 78	GLS Station ident (4)	5.243
79 thru 83	Blank (5)	
84 thru 85	Service Volume Radius (2)	5.245
86 thru 87	TDMA Slots (2)	5.246
88 thru 90	GLS Approach Slope (3)	5.52
91 thru 95	Magnetic Variation (5)	5.39
96 thru 97	Reserved (2)	
98 thru 102	Station Elevation (5)	5.74
103 thru 105	Datum Code (3)	5.197
106 thru 108	Station Type (3)	5.247
109 thru 110	Blank (3)	
111 thru 115	Station Elevation WGS84 (5)	5.248
116 thru 123	Blank (8)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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Note 1: GLS reference point should be equal to IFR landing threshold position, as it is the trajectory reference point.

Note 2: All the latitudes/longitudes of the record refer to the same datum code.

4.1.30 Alternate Record (RA)

The Alternate Record file contains a listing of up to six Alternate Airport Identifiers or, up to six Alternate Company Route Identifiers or any combination of Alternate Airport or Alternate Route Identifiers for a given departure airport, destination airport or enroute fix. The data content of the record is customer defined.

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.1.30.1 Primary Records

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Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 11	Alternate Related Airport or Fix (5)	5.75
12 thru 13	Alternate Related ICAO Code (2)	5.14
14	Alternate Related Section Code (1)	5.4
15	Alternate Related Subsection Code (1)	5.5
16 thru 17	Alternate Record Type (2)	5.250
18 thru 19	Blank (spacing) (2)	
20 thru 22	Distance to Alternate (3)	5.251
23	Alternate Type (1)	5.252
24 thru 33	Primary Alternate Identifier (10)	5.253
34 thru 35	Blank (spacing) (2)	
36 thru 38	Distance to Alternate (3)	5.251
39	Alternate Type (1)	5.252
40 thru 49	Additional Alternate Identifier One (10)	5.253
50 thru 51	Blank (spacing) (2)	
52 thru 54	Distance to Alternate (3)	5.251
55	Alternate Type (1)	5.252
56 thru 65	Additional Alternate Identifier Two (10)	5.253
66 thru 67	Blank (spacing) (2)	
68 thru 70	Distance to Alternate (3)	5.251
71	Alternate Type (1)	5.252
72 thru 81	Additional Alternate Identifier Three (10)	5.253
82 thru 83	Blank (spacing) (2)	
84 thru 86	Distance to Alternate (3)	5.251
87	Alternate Type (1)	5.252
88 thru 97	Additional Alternate Identifier Four (10)	5.253
98 thru 99	Blank (spacing) (2)	
100 thru 102	Distance to Alternate (3)	5.251
103	Alternate Type (1)	5.252
104 thru 113	Additional Alternate Identifier Five (10)	5.253
114 thru 123	Reserved (expansion) (10)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.2 Master Helicopter User File (HA)

This Section contains record information unique to helicopter operations. In addition to the records identified in this Section, records identified in Section 4.1 Master Airline User File are used in the Master Helicopter User File.

4.2.1 Heliport Records

This file will contain heliport information.

4.2.1.1 Heliport Primary Records

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Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (Spacing) (1)	
7 thru 10	Heliport Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5.14
13	Subsection Code (1)	5.5
14 thru 16	ATA/IATA Designator (3)	5.107
17 thru 21	PAD Identifier (5)	5.180
22	Continuation Record No. (1)	5.16
23 thru 27	Speed Limit Altitude (5)	5.73
28 thru 30	Datum Code (3)	5.197
31	IFR Indicator (1)	5.108
32	Blank (Spacing) (1)	
33 thru 41	Latitude (9)	5.36
42 thru 51	Longitude (10)	5.37
52 thru 56	Magnetic Variation (5)	5.39
57 thru 61	Heliport Elevation (5)	5.55
62 thru 64	Speed Limit (3)	5.72
65 thru 68	Recommended VHF Navaid (4)	5.23
69 thru 70	ICAO Code (2)	5.14
71 thru 75	Transition Altitude (5)	5.53
76 thru 80	Transition Level (5)	5.53
81	Public Military Indicator (1)	5.177
82 thru 84	Time Zone (3)	5.178
85	Daylight Indicator (1)	5.179
86 thru 91	Pad Dimensions (6)	5.176
92	Magnetic/True Indicator (1)	5.165
93	Reserved (Expansion) (1)	
94 thru 123	Heliport Name (30)	5.71
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.2.1.2 Heliport Continuation Records

Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23	Reserved (Spacing) (1)	
24 thru 92	Notes (69)	5.61
93 thru 123	Reserved (Expansion) (31)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.2.1.3 Heliport Flight Planning Continuation Records

This Continuation Record is used to indicate the FIR and/or UIR within which the Airport defined in the Primary Record resides, to provide the Start/End validity dates/times of the Primary Record, and to provide an indication if the Heliport defined in the Primary Record is associated with Controlled Airspace.

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Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record Number (1)	5.16
23	Application Type (1)	5.91
24 thru 27	FIR Identifier (4)	5.116
28 thru 31	UIR Identifier (4)	5.116
32	Start/End Indicator (1)	5.152
33 thru 43	Start/End Date/Time (11)	5.153
44 thru 66	Blank (spacing) (23)	
67	Controlled A/S Indicator (1)	5.217
68 thru 71	Controlled A/S Airport Identifier (4)	5.6
72 thru 73	Controlled A/S Airport ICAO (2)	5.14
74 thru 123	Blank (spacing) (50)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.2.1.4 Heliport Flight Planning Continuation Records

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Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23	Reserved (Spacing) (1)	5.61
24 thru 92	Notes (69)	
93 thru 123	Reserved (Expansion) (31)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.2.2 Heliport Terminal Waypoint Records (HC)

c-14

The Heliport Terminal Waypoint file contains all terminal waypoints within the geographical area of each heliport. Heliport Terminal Waypoints utilized by two or more heliports will be stored in the Enroute Waypoint file to eliminate duplication. Terminal Waypoints used jointly by an airport and a heliport are also stored in the Enroute waypoint file.

4.2.2.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (spacing) (1)	
7 thru 10	Heliport Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5.14
13	Subsection Code (1)	5.5
14 thru 18	Waypoint Identifier (5)	5.13
19	Blank (spacing) (1)	
20 thru 21	ICAO Code (2)	5.14
22	Continuation Record Number (1)	5.16
23 thru 26	Blank (spacing) (4)	
27 thru 29	Waypoint Type (3)	5.42
30 thru 31	Waypoint Usage (2)	5.82
32	Blank (spacing) (1)	
33 thru 41	Waypoint Latitude (9)	5.36
42 thru 51	Waypoint Longitude (10)	5.37
52 thru 74	Blank (spacing) (23)	
75 thru 79	Dynamic Magnetic Variation (5)	5.39
80 thru 84	Reserved (Expansion) (5)	
85 thru 87	Datum Code (3)	5.197
88 thru 95	Reserved (Expansion) (8)	
96 thru 98	Name Format Indicator (3)	5.196
99 thru 123	Waypoint Name/Description (25)	5.43
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.2.2.2 Continuation Records

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Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record Number (1)	5.16
23	Reserved (spacing) (1)	
24 thru 92	Notes (69)	5.61
93 thru 123	Reserved (Expansion) (31)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note: Column 23 is reserved for an Application Type character.

4.2.2.3 Flight Planning Continuation Records

This Continuation Record is used to indicate the FIR and/or UIR within which the Waypoint defined in the Primary Records is located and to provide the Start/End validity dates/times of the Primary Record where applicable.

Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record Number (1)	5.16
23	Application Type (1)	5.91
24 thru 27	FIR Identifier (4)	5.116
28 thru 31	UIR Identifier (4)	5.116
32	Start/End Indicator (1)	5.152
33 thru 43	Start/End Date (11)	5.153
44 thru 123	Reserved (Expansion) (31)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.2.2.4 Flight Planning Continuation Records

This Continuation Record is used to indicate the fields of the Primary Record that are changed on the Start/End Date. Used in conjunction with Section 4.2.2.3.

Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record Number (1)	5.16
23 thru 123	Fields as on Primary Records	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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4.2.3 Heliport SID/STAR/Approach (HD/HE/HF)

The Heliport Terminal Procedure records comprise three files, (HD) for SIDs, (HE) for STARS and (HF) for Approaches. The SID File contains the sequential listing of published Heliport Standard Instrument Departures. The STAR File contains the sequential listing of published Heliport Standard Terminal Arrival Routes. The Approach Files contain the sequential listing of Heliport Standard Instrument Approach Procedures. SIDs/STARs/Approach Procedures to be used by rotor-wing aircraft at airports are included in the Airport SID/STAR/Approach files, Section 4.1.9.

4.2.3.1 Heliport SID/STAR/Approach Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (spacing) (1)	
7 thru 10	Heliport Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5.14
13	Subsection Code (1)	5.5
14 thru 19	SID/STAR/APP Identifier (6)	5.9, 5.10
20	Route Type (1)	5.7
21 thru 25	Transition Identifier (5)	5.11
26	Multiple Indicator (1) Note 1	5.130
27 thru 29	Sequence Number (3)	5.12
30 thru 34	Fix Identifier (5)	5.13
35 thru 36	ICAO Code (2)	5.14
37	Section Code (1)	5.4
38	Subsection Code (1)	5.5
39	Continuation Record Number (1)	5.16
40 thru 43	Waypoint Description Code (4)	5.17
44	Turn Direction (1)	5.20
45 thru 47	RNP (3)	5.211
48 thru 49	Path and Termination (2)	5.21
50	Turn Direction Valid (1)	5.22
51 thru 54	Recommended Navaid (4)	5.23
55 thru 56	ICAO Code (2)	5.14
57 thru 62	ARC Radius (6)	5.204
63 thru 66	Theta (4)	5.24
67 thru 70	Rho (4)	5.25
71 thru 74	Magnetic Course (4)	5.26
75 thru 78	Route Distance/Holding Distance or Time (4)	5.27
79	Recommended Navaid Section (1)	5.4
80	Recommended Navaid Subsection (1)	5.5
81 thru 82	Reserved (spacing) (2)	
83	Altitude Description (1)	5.29
84	ATC Indicator (1)	5.81
85 thru 89	Altitude (5)	5.30
90 thru 94	Altitude (5)	5.30
95 thru 99	Transition Altitude (5)	5.53
100 thru 102	Speed Limit (3)	5.72
103 thru 106	Vertical Angle (4)	5.70
107 thru 111	Center Fix (5)	5.144
112	Multiple Code (1)	5.130
113 thru 114	ICAO Code (2)	5.14
115	Section Code (1)	5.4
116	Subsection Code (1)	5.5
117	GPS/FMS Indicator (1)	5.222
118	Blank (spacing) (1)	
119	Apch Route Qualifier 1 (1)	5.7
120	Apch Route Qualifier 2 (1)	5.7
121 thru 123	Blank (spacing) (3)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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Note 1: The Multiple Indicators is used on Approach Procedures only.

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.2.3.2 Heliport SID/STAR/Approach Continuation Records

Column	Field Name (Length)	Reference
1 thru 38	Field as on Primary Records	
39	Continuation Record Number (1)	5.16
40	Reserved (spacing) (1)	
41 thru 44	CAT A Decision Height (4)	5.170
45 thru 48	CAT B Decision Height (4)	5.170
49 thru 52	CAT C Decision Height (4)	5.170
53 thru 56	CAT D Decision Height (4)	5.170
57 thru 60	CAT A Minimum Descent Height (4)	5.171
61 thru 64	CAT B Minimum Descent Height (4)	5.171
65 thru 68	CAT C Minimum Descent Height (4)	5.171
69 thru 72	CAT D Minimum Descent Height (4)	5.171
73 thru 85	Blank (spacing) (13)	
86 thru 89	Procedure Category (4)	5.242
90 thru 92	Required Navigation Performance, RNP (3)	5.211
93 thru 118	Reserved (Expansion) (25)	
119	Apch Route Qualifier 1 (1)	5.7
120	Apch Route Qualifier 2 (1)	5.7
121 thru 123	Blank (spacing) (3)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

c-14 Note 1: Column 40 is reserved for an Application Type character.

Note 2: Columns 119 and 120 are part of the sort key required to match the Continuation Records to the Primary Record. This non-standard sorting sequence was selected to preserve the Primary Record for SID/STAR/Approach as much as possible at the time the record was introduced in Supplement 14.

Note 3: For records used to define the "All Sensors RNAV" type procedures, the RNP value is carried in columns 90 through 92 of the Continuation Record and is associated with the Procedure Category. In these cases, the RNP value in column 45 through 47 of the Primary Record will be blank.

4.2.3.3 Heliport SID/STAR/Approach Flight Planning Continuation Records

This Continuation Record is used to indicate the Leg Distance for each segment of the Route and to provided the Start/End validity dates/times of the Primary Record where applicable.

Column	Field Name (Length)	Reference
1 thru 38	Fields as on Primary Records	
39	Continuation Record Number (1)	5.16
40	Application Type (1)	5.91
41	Start/End Indicator (1)	5.152
42 thru 52	Start/End Date (11)	5.153
53 thru 74	Blank (spacing) (22)	
75 thru 78	Route Distance (4)	5.27
79 thru 123	Reserved (Expansion) (45)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.2.3.4 Heliport SID/STAR/Approach Flight Planning Continuation Records

This Continuation Record is used to indicate the fields of the Primary Record that are changed on the Start/End Date. Used in conjunction with 4.2.3.3.

Column	Field Name (Length)	Reference
1 thru 38	Fields as on Primary Records	
39	Continuation Record Number (1)	5.16
40 thru 123	Fields as on Primary Records	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.2.4 Heliport MSA (HS)

The Heliport Minimum Sector Altitude (MSA) file contains details relating to available Sector Altitudes.

4.2.4.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (spacing) (1)	
7 thru 10	Heliport Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5.14
13	Subsection Code (1)	5.5
14 thru 18	MSA Center (5)	5.144
19 thru 20	ICAO Code (2)	5.14
21	Section Code (1)	5.4
22	Subsection Code (1)	5.5
23	Multiple Code (1)	5.130
24 thru 38	Reserved (Expansion) (15)	
39	Continuation Record Number (1)	5.16
40	Reserved (spacing) (1)	
41 thru 42	Radius Limit (2)	5.145
43 thru 45	Sector Bearing (3)	5.146
46 thru 48	Sector Altitude (3)	5.147
49 thru 51	Sector Bearing (3)	5.146
52 thru 54	Sector Altitude (3)	5.147
55 thru 57	Sector Bearing (3)	5.146
58 thru 60	Sector Altitude (3)	5.147
61 thru 63	Sector Bearing (3)	5.146
64 thru 66	Sector Altitude (3)	5.147
67 thru 69	Sector Bearing (3)	5.146
70 thru 72	Sector Altitude (3)	5.147
73	Magnetic/True Indicator (1)	5.165
74 thru 123	Reserved (Expansion) (50)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

4.2.4.2 Continuation Records

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Column	Field Name (Length)	Reference
1 thru 38	Fields as on Primary Records	
39	Continuation Record Number (1)	5.16
40	Reserved (spacing) (1)	
41 thru 109	Notes (69)	5.61
110 thru 123	Reserved (Expansion) (31)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note: Column 40 is reserved for an Application Type character.

4.2.5 Heliport Communications Records (HV)

These files will contain Heliport Communications Facilities.

4.2.5.1 Heliport Communications Primary Records

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Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (spacing) (1)	
7 thru 10	Heliport Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5.14
13	Subsection Code (1)	5.5
14 thru 16	Communications Type (3)	5.101
17 thru 23	Communications Freq (7)	5.103
24	Guard/Transmit (1)	5.182
25	Frequency Units (1)	5.104
26	Continuation Record No. (1)	5.16
27 thru 29	Service Indicator (3)	5.106
30	Radar Service (1)	5.102
31	Modulation (1)	5.198
32	Signal Emission (1)	5.199
33 thru 41	Latitude (9)	5.36
42 thru 51	Longitude (10)	5.37
52 thru 56	Magnetic Variation (5)	5.39
57 thru 61	Facility Elevation (5)	5.92
62	H24 Indicator (1)	5.181
63 thru 68	Sectorization (6)	5.183
69	Altitude Description (1)	5.29
70 thru 74	Communication Altitude (5)	5.184
75 thru 79	Communication Altitude (5)	5.184
80 thru 83	Sector Facility (4)	5.185
84 thru 85	ICAO Code (2)	5.14
86	Section Code (1)	5.4
87	Subsection Code (1)	5.5
88	Distance Description (1)	5.187
89 thru 90	Communications Distance (2)	5.188
91 thru 94	Remote Facility (40)	5.200
95 thru 96	ICAO Code (2)	5.14
97	Section Code (1)	5.4
98	Subsection Code (1)	5.5
99 thru 123	Call Sign (25)	5.105
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.2.5.2 Heliport Communications Continuation Records

Column	Field Name (Length)	Reference
1 thru 25	Fields as on Primary Records	
26	Continuation Record No. (1)	5.16
27	Blank (spacing) (1)	
28 thru 87	Narrative (60)	5.186
88 thru 123	Reserved (Expansion) (36)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.2.5.3 Heliport Communications Continuation Records

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Column	Field Name (Length)	Reference
1 thru 25	Fields as on Primary Records	
26	Continuation Record No.(1)	5.16
27	Blank (Spacing) (1)	
28	Time Code (1)	5.131
29	NOTAM (1)	5.132
30	Time Indicator (1)	5.138
31 thru 40	Time of Operation (10)	5.195
41 thru 50	Time of Operation (10)	5.195
51 thru 60	Time of Operation (10)	5.195
61 thru 70	Time of Operation (10)	5.195
71 thru 80	Time of Operation (10)	5.195
81 thru 90	Time of Operation (10)	5.195
91 thru 100	Time of Operation (10)	5.195
101thru 123	Reserved (Expansion) (23)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

ARINC 424 - 15 RECORD FORMAT

VHF NAVAID (D) 4.1.2.1 PRIMARY

Ref	5.2	5.3	5.4	5.5	5.6	5.14		5.33		5.14	5.16	5.34	5.35	5.36	5.37	5.38	5.36	5.37	5.66	5.40	5.149	5.90	5.150	5.197	5.71	5.31	5.32
Field	S/T	CUST/ AREA	SEC CODE	SUB CODE	ARPT IDENT	ICAO CODE		VOR IDENT		ICAO CODE	CONT NR	VOR FREQ	VHF CLASS	VOR LATITUDE	VOR LONGITUDE	DME IDENT	DME LATITUDE	DME LONGITUDE	STA DECL	DME ELEV	MERIT	DME BIAS	FREQ PRD	DATUM CODE	VHF NAVAID NAME (30)	FILE RECORD NUMBER	CYCLE

NOTES:

VHF NAVAID (D) 4.1.2.2 CONTINUATION

Ref	SAME PARAGRAPHS ABOVE	5.16		5.61		5.31	5.32
Field	CONTINUATION RECORD SAME AS ABOVE	CONT NR		NOTES ON CONTINUATION RECORD (69)	RESERVED (31)	FILE RECORD NUMBER	CYCLE

NOTES:

VHF NAVAID (D) 4.1.2.3 SIMULATION CONTINUATION

Ref	SAME PARAGRAPHS ABOVE	5.16	5.91		5.93		5.39	5.92		5.31	5.32
Field	CONTINUATION RECORD SAME AS ABOVE	CONT NR	USER		FAC CHAR		D MAG VAR	FAC ELEV	RESERVED (39)	FILE RECORD NUMBER	CYCLE

NOTES:

VHF NAVAID (D) 4.1.2.4 FLIGHT PLANNING CONTINUATION

Ref	SAME PARAGRAPHS ABOVE	5.16	5.91	5.116	5.116	5.152	5.153		5.31	5.32
Field	CONTINUATION RECORD SAME AS ABOVE	CONT NR	USER	FIR IDENT	UIR IDENT	S/E IND	START/END DATE	RESERVED (80)	FILE RECORD NUMBER	CYCLE

NOTES:

VHF NAVAID (D) 4.1.2.5 FLIGHT PLANNING CONTINUATION

Ref	SAME PARAGRAPHS ABOVE	5.16	SAME PARAGRAPH AS PRIMARY RECORD (4.1.2.1)	5.31	5.32
Field	CONTINUATION RECORD SAME AS ABOVE	CONT NR	CONTINUATION RECORD SAME AS PRIMARY RECORD (4.1.2.1)	FILE RECORD NUMBER	CYCLE

NOTES:

VHF NAVAID (D) 4.1.2.6 LIMITATION CONTINUATION

Ref	SAME PARAGRAPHS ABOVE	5.16		5.205	5.206	5.12	5.207	5.187	5.208	5.29	5.209	5.207	5.187	5.208	5.29	5.209	5.207	5.187	5.208	5.29	5.209	5.207	5.187	5.208	5.29	5.209	5.207	5.187	5.208	5.29	5.209	5.210		5.31	5.32
Field	CONTINUATION RECORD SAME AS ABOVE	CONT NR		NLC	CA	SEQ NR	SECTOR	DISTDESC	DIST LIMIT	ALT DESC	ALT LIMIT	SECTOR	DISTDESC	DIST LIMIT	ALT DESC	ALT LIMIT	SECTOR	DISTDESC	DIST LIMIT	ALT DESC	ALT LIMIT	SECTOR	DISTDESC	DIST LIMIT	ALT DESC	ALT LIMIT	SECTOR	DISTDESC	DIST LIMIT	ALT DESC	ALT LIMIT	SEQ IND		FILE RECORD NUMBER	CYCLE

NOTES:

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

ARINC 424 - 15 RECORD FORMAT

NDB NAVAID (DB)(PN) 4.1.3.1 PRIMARY

5.2	5.3	5.4	5.5	5.6	5.14		5.33		5.14	5.16	5.34	5.35	5.36	5.37		5.39			5.197	5.71	5.31	5.32
S/T	CUST/ AREA	SEC CODE	SUB CODE	ARPT IDENT	ICAO CODE		NDB IDENT		ICAO CODE	CONT NR	NDB FREQ	NDB CLASS	NDB LATITUDE	NDB LONGITUDE		MAG VAR		RESERVED	DATUM CODE	NDB NAVAID NAME (30)	FILE RECORD NUMBER	CYCLE

NOTES:

NDB NAVAID (DB)(PN) 4.1.3.2 CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16		5.61		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR		NOTES ON CONTINUATION RECORD (69)	RESERVED (31)	FILE RECORD NUMBER	CYCLE

NOTES:

NDB NAVAID (DB)(PN) 4.1.3.3 SIMULATION CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16	5.91		5.93		5.92		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	USER		FAC CHAR		FAC ELEV	RESERVED (39)	FILE RECORD NUMBER	CYCLE

NOTES:

NDB NAVAID (DB)(PN) 4.1.3.4 FLIGHT PLANNING CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16	5.91	5.116	5.116	5.152	5.153		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	USER	FIR IDENT	UIR IDENT	S/E IND	START/END DATE	RESERVED (80)	FILE RECORD NUMBER	CYCLE

NOTES:

NDB NAVAID (DB)(PN) 4.1.3.5 FLIGHT PLANNING CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16	SAME PARAGRAPH AS PRIMARY RECORD (4.1.3.1)	5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	CONTINUATION RECORD SAME AS PRIMARY RECORD (4.1.3.1)	FILE RECORD NUMBER	CYCLE

NOTES:

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

ARINC 424 - 15 RECORD FORMAT

WAYPOINT (EA)(PC) 4.1.4.1 PRIMARY

Field	Reference
S/T	5.2
CUST/AREA	5.3
SEC CODE	5.4
SUB CODE	5.5
REGN /ARPT CODE	5.41
ICAO CODE	5.14
SUB CODE	5.5
WAYPOINT IDENT	5.13
(blank)	
ICAO CODE	5.14
CONT NR	5.16
(blank)	
TYPE	5.42
USEAGE	5.82
(blank)	
LATITUDE	5.36
LONGITUDE	5.37
(blank)	
D MAG VAR	5.39
WP ELEV (REST FOR SIM)	5.XXX
DATUM CODE	5.197
(blank)	
NAME IND	5.196
NAME/DESC (25)	5.43
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

WAYPOINT (EA)(PC) 4.1.4.2 CONTINUATION

Field	Reference
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPHS ABOVE
CONT NR	5.16
(blank)	
NOTES ON CONTINUATION RECORD (69)	5.61
RESERVED (31)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

WAYPOINT (EA)(PC) 4.1.4.3 FLIGHT PLANNING CONTINUATION

Field	Reference
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPHS ABOVE
CONT NR	5.16
USER	5.91
FIR IDENT	5.116
UIR IDENT	5.116
SE IND	5.152
START/END DATE	5.153
RESERVED (80)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

WAYPOINT (EA)(PC) 4.1.4.4 FLIGHT PLANNING CONTINUATION

Field	Reference
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPHS ABOVE
CONT NR	5.16
CONTINUATION RECORD SAME AS PRIMARY RECORD (4.1.4.1)	SAME PARAGRAPH AS PRIMARY RECORD (4.1.4.1)
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

HOLDING PATTERN (EP) 4.1.5.1 PRIMARY

Field	Reference
S/T	5.2
CUST/AREA	5.3
SEC CODE	5.4
SUB CODE	5.5
REGN CODE	5.41
ICAO CODE	5.14
(blank)	
DUP IDBIT	5.114
FIX IDENT	5.13
ICAO CODE	5.14
SEC CODE	5.4
SUB CODE	5.5
CONT NR	5.16
IB HOLD CRS	5.62
TURN DIR	5.63
LEG LENGTH	5.64
LEG TIME	5.65
MINIMUM ALTITUDE	5.30
MAXIMUM ALTITUDE	5.127
HOLD SPEED	5.175
RESERVED (36)	
NOTES (25)	5.60
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

HOLDING PATTERN (EP) 4.1.5.2 CONTINUATION

Field	Reference
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPHS ABOVE
CONT NR	5.16
(blank)	
NOTES ON CONTINUATION RECORD (69)	5.61
RESERVED (14)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

ARINC 424-15 RECORD FORMAT

ENROUTE AIRWAYS (ER) 4.1.6.1 PRIMARY

5.2	5.3	5.4	5.5	5.8		5.12	5.13	5.14	5.4	5.5	5.16	5.17	5.18	5.7	5.19	5.115	5.104	5.164	5.23	5.14	5.211	5.24	5.25	5.26	5.27	5.28	5.30	5.30	5.127		5.31	5.32
S/T	CUST/ AREA	SEC CODE	SUB CODE	ROUTE IDENT	SIX CHAR	SEQ NR	FIX IDENT	ICAO CODE	SEC CODE	SUB CODE	CONT NR	DESC CODE	BDY CODE	RT TYPE	LEVEL	DIRECT	TC IND	UE IND	RECD VHF	ICAO CODE	RNP	THETA	RHO	OB MAG CRS	ROUTE FROM DIST	IB MAG CRS	MIN ALTITUDE	MIN ALTITUDE	MAX ALTITUDE	RESERVED (25)	FILE RECORD NUMBER	CYCLE

NOTES:

ENROUTE AIRWAYS (ER) 4.1.6.2 CONTINUATION

	5.16	5.61		5.31	5.32
SAME PARAGRAPHS ABOVE CONTINUATION RECORD SAME AS ABOVE	CONT NR	NOTES ON CONTINUATION RECORD (69)	RESERVED (14)	FILE RECORD NUMBER	CYCLE

NOTES:

ENROUTE AIRWAYS (ER) 4.1.6.3 FLIGHT PLANNING CONTINUATION

	5.16	5.91	5.152	5.153	5.14	5.128	5.129	5.130	5.14	5.128	5.129	5.130	5.14	5.128	5.129	5.130	5.14	5.128	5.129	5.130	5.174	5.31	5.32
SAME PARAGRAPHS ABOVE CONTINUATION RECORD SAME AS ABOVE	CONT NR	USER	SE IND	START/END DATE	ICAO CODE	REST TYPE	RESTRICTIVE AIRSPACE DESIGNATION	MULTI CD	ICAO CODE	REST TYPE	RESTRICTIVE AIRSPACE DESIGNATION	MULTI CD	ICAO CODE	REST TYPE	RESTRICTIVE AIRSPACE DESIGNATION	MULTI CD	ICAO CODE	REST TYPE	RESTRICTIVE AIRSPACE DESIGNATION	MULTI CD	LH CONT	FILE RECORD NUMBER	CYCLE

NOTES:

ENROUTE AIRWAYS (ER) 4.1.6.4 FLIGHT PLANNING CONTINUATION

	5.16		5.31	5.32
SAME PARAGRAPHS ABOVE CONTINUATION RECORD SAME AS ABOVE	CONT NR	SAME PARAGRAPH AS PRIMARY RECORD (4.1.6.1) CONTINUATION RECORD SAME AS PRIMARY RECORD (4.1.6.1)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT (PA) 4.1.7.1 PRIMARY

5.2	5.3	5.4	5.6	5.14	5.5	5.107		5.16	5.73	5.54	5.108	5.36	5.37	5.39	5.55	5.72	5.23	5.14	5.53	5.53	5.177	5.178	5.179	5.165	5.197		5.71	5.31	5.32
S/T	CUST/ AREA	SEC CODE	ARPT IDENT	ICAO CODE	SUB CODE	ATA/ IATA	RESERVED	CONT NR	SPEED LIMIT ALTITUDE	LONGEST RWY	IFR	LATITUDE	LONGITUDE	MAG VAR	ELEV	SPEED LIMIT	RECD VHF	ICAO CODE	TRANS ALTITUDE	TRANS LEVEL	PUB/MIL	TIME ZONE	DAY TIME	MT IND	DATUM CODE	RESVD (4)	AIRPORT NAME (30)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT (PA) 4.1.7.2 CONTINUATION

	5.16			5.31	5.32
SAME PARAGRAPHS ABOVE CONTINUATION RECORD SAME AS ABOVE	CONT NR	NOTES ON CONTINUATION RECORD (69)	RESERVED (69)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT (PA) 4.1.7.3 FLIGHT PLANNING CONTINUATION

	5.16	5.91	5.116	5.116	5.152	5.153		5.217	5.6	5.14		5.31	5.32
SAME PARAGRAPHS ABOVE CONTINUATION RECORD SAME AS ABOVE	CONT NR	USER	FIR IDENT	UIR IDENT	SE IND	START/END DATE	RESERVED (23)	AS IND	AS ARPT IDENT	AS ICAO CODE	RESERVED (50)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT (PA) 4.1.7.4 FLIGHT PLANNING CONTINUATION

	5.16		5.31	5.32
SAME PARAGRAPHS ABOVE CONTINUATION RECORD SAME AS ABOVE	CONT NR	SAME PARAGRAPH AS PRIMARY RECORD (4.1.7.1) CONTINUATION RECORD SAME AS PRIMARY RECORD (4.1.7.1)	FILE RECORD NUMBER	CYCLE

NOTES:

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

ARINC 424 - 15 RECORD FORMAT

AIRPORT GATE (PB) 4.1.8.1 PRIMARY

5.2	5.3	5.4		5.6	5.14	5.5	5.56		5.16		5.36	5.37	5.XXX		5.60	5.31	5.32
S/T	CUST/ AREA	SEC CODE		ARPT IDENT	ICAO CODE	SUB CODE	GATE IDENT		CONT NR		LATITUDE	LONGITUDE	MAG HDG (RESV FOR SIM)	RESERVED (43)	NOTES (25)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT GATE (PB) 4.1.8.2 CONTINUATION

SAME PARAGRAPHS ABOVE	5.16	5.61		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	NOTES ON CONTINUATION RECORD (69)	RESERVED (31)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT SIDS/STARS/APPROACH (PD/PE/PF) 4.1.9.1 PRIMARY

5.2	5.3	5.4		5.6	5.14	5.5	5.9 & 5.10	5.7	5.11		5.12	5.13	5.14	5.5	5.5	5.16	5.17	5.20	5.211	5.21	5.22	5.23	5.14	5.204	5.24	5.25	5.26	5.27	5.4	5.5		5.29	5.81	5.30	5.30	5.53	5.72	5.70	5.144	5.130	5.14	5.4	5.6	5.222		5.7	5.7		5.31	5.32
S/T	CUST/ AREA	SEC CODE		ARPT IDENT	ICAO CODE	SUB CODE	SID/STAR/APP IDENT	RT TYPE	TRANS IDENT		SEQ NR	FIX IDENT	ICAO CODE	SEC CODE	SUB CODE	CONT NR	DESC CODE	TURN DIR	RNP	PATH TERM	TDV	RECD NAVAID	ICAO CODE	ARC RADIUS	THETA	RHO	MAG CRS	RTE DIST HOLD DIST/TIME	SEC CODE	SUB CODE		ALT DESC	ATC	ALTITUDE	ALTITUDE	TRANS ALTITUDE	SPEED LIMIT	VERT ANGLE	CENTER FIX	MULTI CD	ICAO CODE	SEC CODE	SUB CODE	GPS/FMS IND		RTE QUAL1	RTE QUAL2		FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT SIDS/STARS/APPROACH (PD/PE/PF) 4.1.9.2 CONTINUATION

SAME PARAGRAPHS ABOVE	5.16		5.170	5.170	5.170	5.170	5.171	5.171	5.171	5.171		5.242	5.211		5.7	5.7		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR		CAT A DH	CAT B DH	CAT C DH	CAT D DH	CAT A MDH	CAT B MDH	CAT C MDH	CAT D MDH		PROC CAT	RNP	RESERVED (26)	RTE QUAL1	RTE QUAL2		FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT SIDS/STARS/APPROACH (PD/PE/PF) 4.1.9.3 FLIGHT PLANNING CONTINUATION

SAME PARAGRAPHS ABOVE	5.16	5.91	5.182	5.153		5.27		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	USER	S/E IND	START/END DATE		RTE DIST	RESERVED (45)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT SIDS/STARS/APPROACH (PD/PE/PF) 4.1.9.4 FLIGHT PLANNING CONTINUATION

SAME PARAGRAPHS ABOVE	5.16	SAME PARAGRAPH AS PRIMARY RECORD (4.9.1)	5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	CONTINUATION RECORD SAME AS PRIMARY RECORD (4.9.1)	FILE RECORD NUMBER	CYCLE

NOTES:

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

ARINC 424 - 15 RECORD FORMAT

RUNWAY (PG) 4.1.10.1 PRIMARY

5.2	5.3	5.4		5.6	5.14	5.5	5.46		5.16	5.57	5.58		5.36	5.37	5.212		5.68	5.69	5.67	5.109		5.44	5.80	5.79	5.44	5.80		5.59	5.31	5.32
S/T	CUST/ AREA	SEC CODE		ARPT IDENT	ICAO CODE	SUB CODE	RUNWAY IDENT		CONT NR	RUNWAY LENGTH	RUNWAY BEARING		LATITUDE	LONGITUDE	RWY GRAD		LNDG THRES ELEV	DSPLCD THR	TCH	WIDTH		LOC/MLS/ GLS IDENT	CAT/CLASS	STOPWAY	SEC LOC/ MLS/GLS IDENT	CAT/CLASS	RESERVED	RUNWAY DESCRIPTION (22)	FILE RECORD NUMBER	CYCLE

NOTES:

RUNWAY (PG) 4.1.10.2 CONTINUATION

SAME PARAGRAPHS ABOVE	5.16		5.61		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR		NOTES ON CONTINUATION RECORD (69)	RESERVED (31)	FILE RECORD NUMBER	CYCLE

NOTES:

RUNWAY (PG) 4.1.10.3 SIMULATION CONTINUATION

SAME PARAGRAPHS ABOVE	5.16	5.91		5.94	5.95		5.98	5.97		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	USER		TRUE BEARING	SOURCE		LOCATION	TDZ ELEV	RESERVED (52)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT & HELIPORT LOCALIZER & G.S. (PI) 4.1.11.1 PRIMARY

5.2	5.3	5.4		5.6	5.14	5.5	5.44	5.80		5.16	5.45	5.46	5.36	5.37	5.47	5.36	5.37	5.48	5.49	5.50	5.51	5.52	5.66	5.67	5.74	5.59	5.31	5.32
S/T	CUST/ AREA	SEC CODE		ARPT IDENT	ICAO CODE	SUB CODE	LOC IDENT	CAT		CONT NR	FREQ	RUNWAY IDENT	LOC LATITUDE	LOC LONGITUDE	LOC BRG	G.S. LATITUDE	G.S. LONGITUDE	LOC FR RW END		G.S. FR RW THRES	LOC WIDTH	G.S. ANGLE	STA DECL	TCH	G.S. ELEV	RESERVED (21)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT & HELIPORT LOCALIZER & G.S. (PI) 4.1.11.2 CONTINUATION

SAME PARAGRAPHS ABOVE	5.16		5.61		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR		NOTES ON CONTINUATION RECORD (69)	RESERVED (31)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT & HELIPORT LOCALIZER & G.S. (PI) 4.1.11.3 SIMULATION CONTINUATION

SAME PARAGRAPHS ABOVE	5.16	5.91		5.93		5.94	5.95		5.96	5.10	5.10	5.10	5.10	5.10		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	USER		FAC CHAR		TRUE BEARING	SOURCE		G.S. BEAM WIDTH	APP IDENT 1	APP IDENT 2	APP IDENT 3	APP IDENT 4	APP IDENT 5		FILE RECORD NUMBER	CYCLE

NOTES:

424 6.CDR

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

ARINC 424 - 15 RECORD FORMAT

COMPANY ROUTE (R) 4.1.12.1 PRIMARY

5.2	5.3	5.4	5.5	5.75		5.14	5.4	5.5	5.75		5.14	5.4	5.5	5.76	5.12	5.77	5.78	5.3	5.83	5.14	5.4	5.5	5.84	5.85		5.86	5.87	5.14	5.88	5.89	5.148		5.31	5.32
S/T	CUST/ AREA	SEC CODE	SUB CODE	FROM ARPT/FIX		ICAO CODE	SEC CODE	SUB CODE	FROM ARPT/FIX		ICAO CODE	SEC CODE	SUB CODE	COMPANY ROUTE ID	SEQ NO.	VIA	S/S/A AWY	AREA	TO FIX	ICAO CODE	SEC CODE	SUB CODE	RUNWAY TRANS	ENRT TRANS		CRUISE ALTITUDE	TERM/ ALT ARPT	ICAO CODE	ALT DIST	COST INDEX	ENRT ALT ARPT	RESERVED (29)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT & HELIPORT LOCALIZER MARKERS/ LOCATORS (PM) 4.1.13.1 PRIMARY

5.2	5.3	5.4		5.6	5.14	5.5	5.44	5.99		5.16	5.34	5.46	5.36	5.37	5.100	5.36	5.37	5.35	5.93	5.33		5.39		5.92		5.31	5.32
S/T	CUST/ AREA	SEC CODE		ARPT IDENT	ICAO CODE	SUB CODE	LOC IDENT	MKR TYPE		CONT NR	LCTR FREQ	RUNWAY IDENT	MKR LATITUDE	MKR LONGITUDE	MINOR AXIS TRUE BRG	LOCATOR LATITUDE	LOCATOR LONGITUDE	LCTR CLASS	LCTR FAC CHAR	LCTR IDENT		MAG VAR		FAC ELEV	RESERVED (21)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT COMM (PV) 4.1.14.1 PRIMARY

5.2	5.3	5.4		5.6	5.14	5.5	5.101	5.103	5.182	5.104	5.16	5.106	5.102	5.198	5.199	5.36	5.37	5.39	5.92	5.181	5.183	5.29	5.184	5.184	5.185	5.14	5.4	5.5	5.187	5.188	5.200	5.14	5.4	5.5	5.105	5.31	5.32
S/T	CUST/ AREA	SEC CODE		ARPT IDENT	ICAO CODE	SUB CODE	COMM TYPE	COMM FREQ	G/T	FREQ UNIT	CONT NR	SERV IND	RADAR	MODULAT	SIG EM	LATITUDE	LONGITUDE	MAG VAR	FAC ELEV	H24 IND	SECTOR	ALT DESC	ALTITUDE 1	ALTITUDE 2	SECTOR FAC	ICAO CODE	SEC CODE	SUB CODE	DIST DESC	COMM DIST	REMOTE FAC	ICAO CODE	SEC CODE	SUB CODE	CALL SIGN (25)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT COMM (PV) 4.1.14.2 CONTINUATION

SAME PARAGRAPHS ABOVE	5.16		5.186		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR		NARRATIVE (61)	RESERVED (36)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT COMM (PV) 4.1.14.3 CONTINUATION

SAME PARAGRAPHS ABOVE	5.16		5.131	5.132	5.138	5.195	5.195	5.195	5.195	5.195	5.195	5.195		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR		TIME CD	NOTAM	TIME IND	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	RESERVED (23)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRWAY MARKERS (EM) 4.1.15.1 PRIMARY

5.2	5.3	5.4	5.5		5.110		5.14	5.16	5.111		5.112	5.113		5.36	5.37	5.100		5.39	5.92	5.197		5.71	5.31	5.32
S/T	CUST/ AREA	SEC CODE	SUB CODE		MARKER IDENT		ICAO CODE	CONT NR	MARKER CODE		SHAPE	H LOW		LATITUDE	LONGITUDE	MINOR AXIS TRUE BRG	RESERVED (15)	MAG VAR	FAC ELEV	DATUM CODE	RESERVED (6)	MARKER NAME (30)	FILE RECORD NUMBER	CYCLE

NOTES:

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

ARINC 424 - 15 RECORD FORMAT

CRUISING TABLES (TC) 4.1.16.1 PRIMARY

Field	Reference
ST	5.2
SEC CODE	5.4
SUB CODE	5.5
CRSE TBL IDENT	5.134
COURSE FROM	5.135
COURSE TO	5.135
MAT IND	5.165
CRUISE LEVEL FROM	5.136
VERTICAL SEPARATION	5.137
CRUISE LEVEL TO	5.136
CRUISE LEVEL FROM	5.136
VERTICAL SEPARATION	5.137
CRUISE LEVEL TO	5.136
CRUISE LEVEL FROM	5.136
VERTICAL SEPARATION	5.137
CRUISE LEVEL TO	5.136
CRUISE LEVEL FROM	5.136
VERTICAL SEPARATION	5.137
CRUISE LEVEL TO	5.136
RESERVED (24)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

FIR/UIR (UF) 4.1.17.1 PRIMARY

Field	Reference
ST	5.2
CUST/AREA	5.3
SEC CODE	5.4
SUB CODE	5.5
FIR/UIR IDENT	5.116
FIR/UIR ADDRESS	5.151
IND	5.117
SEQ NR	5.12
CONT NR	5.16
ADJ FIR IDENT	5.116
ADJ UIR IDENT	5.116
RUS	5.122
RUA	5.123
ENTRY	5.124
BDRY VIA	5.118
FIR/UIR LATITUDE	5.36
FIR/UIR LONGITUDE	5.37
ARC ORIGIN LATITUDE	5.36
ARC ORIGIN LONGITUDE	5.37
ARC DIST	5.119
ARC BNG	5.120
FIR UPPER LIMIT	5.121
UIR LOWER LIMIT	5.121
UIR UPPER LIMIT	5.121
TC IND	5.124
FIR/UIR NAME (25)	5.125
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

RESTRICTIVE AIRSPACE (UR) 4.1.18.1 PRIMARY

Field	Reference
ST	5.2
CUST/AREA	5.3
SEC CODE	5.4
SUB CODE	5.5
ICAO CODE	5.14
REST TYPE	5.128
RESTRICTIVE AIRSPACE DESIGNATION	5.129
MULTI CD	5.130
SEQ NR	5.12
CONT NR	5.16
LEVEL	5.19
TIME CD	5.131
NOTAM	5.132
BDRY VIA	5.118
LATITUDE	5.36
LONGITUDE	5.37
ARC ORIGIN LATITUDE	5.36
ARC ORIGIN LONGITUDE	5.37
ARC DIST	5.119
ARC BNG	5.120
LOWER LIMIT	5.121
UNIT IND	5.133
UPPER LIMIT	5.121
UNIT IND	5.133
RESTRICTIVE AIRSPACE NAME (30)	5.126
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

RESTRICTIVE AIRSPACE (UR) 4.1.18.2 CONTINUATION

Field	Reference
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPH AS ABOVE
CONT NR	5.16
TIME CD	5.131
NOTAM	5.132
TIME IND	5.138
TIME OF OPERATION	5.195
TIME OF OPERATION	5.195
TIME OF OPERATION	5.195
TIME OF OPERATION	5.195
TIME OF OPERATION	5.195
TIME OF OPERATION	5.195
TIME OF OPERATION	5.195
CONTROLLING AGENCY (25)	5.140
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

RESTRICTIVE AIRSPACE (UR) 4.1.18.3 CONTINUATION

Field	Reference
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPH AS ABOVE
CONT NR	5.16
SE IND	5.152
START/END DATE	5.153
RESERVED (82)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

GRID MINIMUM OFF ROUTE ALTITUDE (MORA) RECORDS (AS) 4.1.19.1 PRIMARY

Field	Reference
ST	5.2
SEC CODE	5.4
SUB CODE	5.5
START LAT	5.141
START LONG	5.142
MORA (30 fields)	5.143
RESVD	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

ARINC 424 - 15 RECORD FORMAT

AIRPORT MINIMUM SECTOR ALTITUDE (MSA) (PS) 4.1.20.1 PRIMARY

Field	Ref
S/T	5.2
CUST/AREA	5.3
SEC CODE	5.4
ARPT IDENT	5.6
ICAO CODE	5.14
SUB CODE	5.5
MSA CENTER	5.144
ICAO CODE	5.14
SEC CODE	5.4
SUB CODE	5.5
MULTI CD	5.130
RESERVED (15)	
CONT NR	5.16
RADIUS LIMIT	5.145
SEC BRG	5.146
SEC ALT	5.147
SEC BRG	5.146
SEC ALT	5.147
SEC BRG	5.146
SEC ALT	5.147
SEC BRG	5.146
SEC ALT	5.147
SEC BRG	5.146
SEC ALT	5.147
SEC BRG	5.146
SEC ALT	5.147
SEC BRG	5.146
SEC ALT	5.147
M/T IND	5.165
RESERVED (60)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

AIRPORT MINIMUM SECTOR ALTITUDE (MSA) (PS) 4.1.20.2 CONTINUATION

Field	Ref
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPH AS ABOVE
CONT NR	5.16
NOTES ON CONTINUATION RECORD (69)	5.61
RESERVED (14)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

ENROUTE AIRWAYS RESTRICTION RECORDS (EU) 4.1.21.1 ALTITUDE EXCLUSION PRIMARY

Field	Ref
S/T	5.2
CUST/AREA	5.3
SEC CODE	5.4
SUB CODE	5.5
ROUTE IDENT	5.8
SIX CHAR	
REST IDENT	5.154
REST TYPE	5.201
CONT NR	5.16
START FIX IDENT	5.13
ICAO CODE	5.14
SEC CODE	5.4
SUB CODE	5.5
END FIX IDENT	5.13
ICAO CODE	5.14
SEC CODE	5.4
SUB CODE	5.5
START DATE	5.157
END DATE	5.157
TIME CD	5.131
TIME IND	5.138
TIME OF OPERATION	5.195
TIME OF OPERATION	5.195
TIME OF OPERATION	5.195
TIME OF OPERATION	5.195
EXC IND	5.202
UNITS ALT	5.160
REST ALT	5.161
BLCK IND	5.203
REST ALT	5.161
BLCK IND	5.203
REST ALT	5.161
BLCK IND	5.203
REST ALT	5.161
BLCK IND	5.203
REST ALT	5.161
BLCK IND	5.203
REST ALT	5.161
BLCK IND	5.203
REST ALT	5.161
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

ENROUTE AIRWAYS RESTRICTION RECORDS (EU) 4.1.21.2 ALTITUDE EXCLUSION CONTINUATION

Field	Ref
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPH AS ABOVE
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

ENROUTE AIRWAYS RESTRICTION RECORDS (EU) 4.1.21A.1 NOTE RESTRICTION PRIMARY

Field	Ref
S/T	5.2
CUST/AREA	5.3
SEC CODE	5.4
SUB CODE	5.5
ROUTE IDENT	5.8
SIX CHAR	
REST IDENT	5.154
REST TYPE	5.201
CONT NR	5.16
START FIX IDENT	5.13
ICAO CODE	5.14
SEC CODE	5.4
SUB CODE	5.5
END FIX IDENT	5.13
ICAO CODE	5.14
SEC CODE	5.4
SUB CODE	5.5
START DATE	5.157
END DATE	5.157
RESTRICTION NOTES (69)	5.163
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

ENROUTE AIRWAYS RESTRICTION RECORDS (EU) 4.1.21A.2 NOTE RESTRICTION CONTINUATION

Field	Ref
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPH AS ABOVE
RESERVED (33)	
RESTRICTION NOTES (69)	5.163
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

ENROUTE AIRWAYS RESTRICTION RECORDS (EU) 4.1.21B.1 SEASONAL CLOSURE PRIMARY

Field	Ref
S/T	5.2
CUST/AREA	5.3
SEC CODE	5.4
SUB CODE	5.5
ROUTE IDENT	5.8
SIX CHAR	
REST IDENT	5.154
REST TYPE	5.201
CONT NR	5.16
START FIX IDENT	5.13
ICAO CODE	5.14
SEC CODE	5.4
SUB CODE	5.5
END FIX IDENT	5.13
ICAO CODE	5.14
SEC CODE	5.4
SUB CODE	5.5
START DATE	5.157
END DATE	5.157
TIME CD	5.131
TIME IND	5.138
RESERVED (41)	
EXC IND	5.202
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

ENROUTE AIRWAYS RESTRICTION RECORDS (EU) 4.1.21C.1 CRUISE TABLE REPLACEMENT PRIMARY

Field	Ref
S/T	5.2
CUST/AREA	5.3
SEC CODE	5.4
SUB CODE	5.5
ROUTE IDENT	5.8
SIX CHAR	
REST IDENT	5.154
REST TYPE	5.201
CONT NR	5.16
START FIX IDENT	5.13
ICAO CODE	5.14
SEC CODE	5.4
SUB CODE	5.5
END FIX IDENT	5.13
ICAO CODE	5.14
SEC CODE	5.4
SUB CODE	5.5
START DATE	5.157
END DATE	5.157
TIME CD	5.131
TIME IND	5.138
TIME OF OPERATION	5.195
TIME OF OPERATION	5.195
TIME OF OPERATION	5.195
TIME OF OPERATION	5.195
CRSE TBL IDENT	5.134
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

ENROUTE AIRWAYS RESTRICTION RECORDS (EU) 4.1.21C.2 CRUISE TABLE REPLACEMENT CONTINUATION

Field	Ref
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPH AS ABOVE
RESERVED (33)	
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPH AS ABOVE
FILE RECORD NUMBER	5.31
CYCLE	5.32

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

ARINC 424 - 15 RECORD LAYOUT

AIRPORT & HELIPORT MLS (PL) 4.1.22.1 PRIMARY

5.2	5.3	5.4		5.6	5.14	5.5	5.44	5.80		5.16	5.166		5.46	5.36	5.37	5.167	5.36	5.37	5.167	5.49	5.50	5.168	5.168	5.172	5.172	5.169	5.39	5.74	5.173	5.52		5.31	5.32
S/T	CUST/ AREA	SEC CODE		ARPT IDENT	ICAO CODE	SUB CODE	MLS IDENT	CAT		CONT NR	CHANNEL		RUNWAY IDENT	AZ LATITUDE	AZ LONGITUDE	MLS AZ BRG	EL LATITUDE	EL LONGITUDE	AZ FR RWY END	+/-	EL FR RWY THR	AZ PRO RIGHT	AZ PRO LEFT	AZ COV RIGHT	AZ COV LEFT	EL ANGLE SPAN	MAG VAR	EL ELEV	NOM ELEV ANGLE	MIN ELEV ANGLE	RESERVED (8)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT & HELIPORT MLS (PL) 4.1.22.2 CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16		5.93	5.36	5.37	5.167	5.36	5.37	5.167	5.49		5.168	5.168	5.172	5.172	5.94	5.95	5.94	5.95	5.67		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR		FAC CHAR	BAZ LATITUDE	BAZ LONGITUDE	MLS BAZ BRG	MLS DP LATITUDE	MLS DP LONGITUDE	BAZ FR RWY END	+/-		BAZ PRO RIGHT	BAZ PRO LEFT	BAZ COV RIGHT	BAZ COV LEFT	BAZ TRUE BRG	SOURCE	AZ TRUE BRG	SOURCE	TCH	RESERVED (14)	FILE RECORD NUMBER	CYCLE

NOTES:

ENROUTE COMM (EV) 4.1.23.1 PRIMARY

5.2	5.3	5.4	5.5	5.190	5.161	5.117		5.189	5.101	5.103	5.182	5.104	5.16	5.106	5.102	5.198	5.199	5.36	5.37	5.39	5.92	5.181	5.29	5.184	5.184	5.200	5.14	5.4	5.5		5.31	5.32
S/T	CUST/ AREA	SEC CODE	SUB CODE	FIR/RDO IDENT	FIR/UIR ADDRESS	IND		REMOTE SITE NAME (25)	COMM TYPE	COMM FREQ	G/T	FREQ UNIT	CONT NR	SERV IND	RADAR	MODULAT	SIG EM	LATITUDE	LONGITUDE	MAG VAR	FAC ELEV	H24 IND	ALT DESC	ALTITUDE 1	ALTITUDE 2	REMOTE FAC	ICAO CODE	SEC CODE	SUB CODE	RESERVED (12)	FILE RECORD NUMBER	CYCLE

NOTES:

ENROUTE COMM (EV) 4.1.23.2 CONTINUATION

SAME PARAGRAPH AS ABOVE 5.61	5.16		5.131	5.132	5.138	5.195			5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR		TIME CD	NOTAM	TIME IND	TIME OF OPERATION	RESERVED (23)	CALL SIGN (30)	FILE RECORD NUMBER	CYCLE

NOTES:

ENROUTE COMM (EV) 4.1.23.3 CONTINUATION

SAME PARAGRAPH AS ABOVE 5.61	5.16		5.195	5.195	5.195	5.195	5.195	5.195		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR		TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	RESERVED (2)	FILE RECORD NUMBER	CYCLE

NOTES:

PREFERRED ROUTES (ET) 4.1.24.1 PRIMARY

5.2	5.3	5.4	5.5		5.8	5.220	5.12		5.16	5.83	5.14	5.4	5.5	5.77	5.78	5.3	5.19	5.7	5.194	5.14	5.4	5.5	5.194	5.14	5.4	5.5	5.30	5.127	5.131	5.221	5.116	5.29	5.30	5.30		5.31	5.32
S/T	CUST/ AREA	SEC CODE	SUB CODE		ROUTE IDENT	USE IND	SEQ NR		CONT NR	TO FIX IDENT	ICAO CODE	SEC CODE	SUB CODE	VIA	SID/STAR/AWY IDENT	CUST/ AREA	LEVEL	RTE TYPE	INT APT/ FIX	ICAO CODE	SEC CODE	SUB CODE	TERM APT/ FIX	ICAO CODE	SEC CODE	SUB CODE	MIN ALTITUDE	MAX ALTITUDE	TIME CD	ACFT USE GROUP	DIRECT	ALT DESC	ALTITUDE ONE	ALTITUDE TWO	RESERVED (18)	FILE RECORD NUMBER	CYCLE

NOTES:

PREFERRED ROUTES (ET) 4.1.24.2 CONTINUATION

SAME PARAGRAPHS ABOVE	5.16		5.131	5.138		5.195	5.195	5.195	5.195	5.195	5.195		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR		TIME CD	TIME IND	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	RESERVED (11)	FILE RECORD NUMBER	CYCLE

NOTES:

PREFERRED ROUTES (ET) 4.1.24.3 CONTINUATION

SAME PARAGRAPHS ABOVE	5.16		5.131	5.138	5.61		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR		TIME CD	TIME IND	NOTES ON CONTINUATION RECORD (69)	RESERVED (12)	FILE RECORD NUMBER	CYCLE

NOTES:

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

ARINC 424 - 15 RECORD FORMAT

CONTROLLED AIRSPACE (UC) 4.1.25.1 PRIMARY

Ref	Field
5.2	S/T
5.3	CUST/AREA
5.4	SEC CODE
5.5	SUB CODE
5.14	ICAO CODE
5.213	ARSP TYPE
5.214	AIRSPACE CENTER
5.4	SEC CODE
5.5	SUB CODE
5.215	AS CLASS
	(blank)
5.130	MULTI CD
5.12	SEQ NR
5.16	CONT NR
5.19	LEVEL
5.131	TIME CD
5.132	NOTAM
	(blank)
5.118	BDRY VIA
5.36	LATITUDE
5.37	LONGITUDE
5.36	ARC ORIGIN LATITUDE
5.37	ARC ORIGIN LONGITUDE
5.119	ARC DIST
5.120	ARC BRG
5.211	RNP
5.121	LOWER LIMIT
5.133	UNIT IND
5.121	UPPER LIMIT
5.133	UNIT IND
5.216	CONTROLLED AIRSPACE NAME (30)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

CONTROLLED AIRSPACE (UC) 4.1.25.2 CONTINUATION

Ref	Field
SAME PARAGRAPHS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.131	TIME CD
5.132	NOTAM
5.138	TIME IND
5.195	TIME OF OPERATIONS
5.195	TIME OF OPERATIONS
5.195	TIME OF OPERATIONS
5.195	TIME OF OPERATIONS
5.195	TIME OF OPERATIONS
5.195	TIME OF OPERATIONS
5.195	TIME OF OPERATIONS
5.140	CONTROLLING AGENCY (25)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

GEOGRAPHICAL REFERENCE TABLE RECORDS (TG) 4.26.1 PRIMARY

Ref	Field
5.2	S/T
5.3	CUST/AREA
5.4	SEC CODE
5.5	SUB CODE
5.218	TABLE IDENT
5.12	SEQ NUM
5.219	GEOGRAPHICAL ENTITY
5.16	CONT NR
	(blank)
5.8	PREFERRED ROUTE IDENT
5.220	ET IND
5.8	PREFERRED ROUTE IDENT
5.220	ET IND
5.8	PREFERRED ROUTE IDENT
5.220	(blank)
5.8	PREFERRED ROUTE IDENT
5.220	ET IND
5.8	PREFERRED ROUTE IDENT
5.220	ET IND
5.8	PREFERRED ROUTE IDENT
5.220	ET IND
	(blank)
5.31	FILE RECORD NUMBER
5.32	CYCLE

FLIGHT PLANNING ARRIVAL/DEPARTURE (PR) 4.1.27.1 PRIMARY

Ref	Field
5.2	S/T
5.3	CUST/AREA
5.4	SEC CODE
	(blank)
5.6	ARPT IDENT
5.14	ICAO CODE
5.5	SUB CODE
5.9, 5.10	SID/STAR/APPRCH IDENT
5.230	PROC TYPE
5.11	RUNWAY TRANS IDENT
5.13	RUNWAY TRANS FIX
5.14	ICAO CODE
5.4	SEC CODE
5.5	SUB CODE
5.231	RUNWAY TRANS ATD
5.13	COMMON SEGMENT FIX
5.14	ICAO CODE
5.4	SEC CODE
5.5	SUB CODE
5.231	COMN SEG ATD
5.11	ENROUTE TRANS IDENT
5.13	ENROUTE TRANS FIX
5.14	ICAO CODE
5.4	SEC CODE
5.5	SUB CODE
5.231	ENRTE TRANS ATD
5.12	SEQ NR
5.16	CONT NR
5.232	NOE
5.233	TURBO
5.234	RNAV
5.235	ATC WC
5.236	ATC IDENT
5.131	TIME CD
5.237	PROCEDURE DESCRIPTION
5.238	LTC
5.239	RPT
5.26	OB MAG CRS
5.29	ALT DESC
5.240	ALT
5.240	ALT
5.72	SPEED LIMIT
5.134	CRS TBL IDENT
	(blank)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

FLIGHT PLANNING ARRIVAL/DEPARTURE (PR) 4.1.27.2 CONTINUATION

Ref	Field
SAME PARAGRAPHS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.91	APPL
5.13	INTER FIX IDENT
5.14	ICAO CODE
5.4	SEC CODE
5.5	SUB CODE
5.231	ATD
5.241	FRT CODE
5.13	INTER FIX IDENT
5.14	ICAO CODE
5.4	SEC CODE
5.5	SUB CODE
5.231	ATD
5.241	FRT CODE
5.13	INTER FIX IDENT
5.14	ICAO CODE
5.4	SEC CODE
5.5	SUB CODE
5.231	ATD
5.241	FRT CODE
5.13	INTER FIX IDENT
5.14	ICAO CODE
5.4	SEC CODE
5.5	SUB CODE
5.231	ATD
5.241	FRT CODE
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

FLIGHT PLANNING ARRIVAL/DEPARTURE (PR) 4.1.27.3 CONTINUATION

Ref	Field
SAME PARAGRAPHS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.91	APPL
5.131	TIME CD
5.138	TIME IND
5.195	TIME OF OPERATION
5.195	TIME OF OPERATION
5.195	TIME OF OPERATION
5.195	TIME OF OPERATION
5.195	TIME OF OPERATION
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

PATH POINT (PP) 4.1.28.1

Ref	Field
5.2	S/T
5.1	CUST/AREA
5.4	SEC CODE
	(blank)
5.6	ARPT IDENT
5.14	ICAO CODE
5.5	SUB CODE
5.10	APPROACH IDENT
5.46 OR 5.180	RUNWAY OR HELIPAD IDENT
5.223	OPS TYPE
5.224	APP IND
	(blank)
5.16	CONT NR
5.36	LTP LATITUDE
5.37	LTP LONGITUDE
5.225	(LTP) ELLIPSOIDAL HEIGHT
5.67	TCH
5.226	GPA
5.36	FPAP LATITUDE
5.37	FPAP LONGITUDE
5.225	(FPAP) ELLIPSOIDAL HEIGHT
5.227	(FPAP) ORTHO HEIGHT
5.227	(FPCP) ORTHO HEIGHT
5.228	UNIT
	(blank)
5.229	CRC
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

GLS (PT) 4.1.29.1 PRIMARY

Ref	Field
5.2	S/T
5.3	CUST/AREA
5.4	SEC CODE
	(blank)
5.6	ARPT IDENT
5.14	ICAO CODE
5.5	SUBCODE
5.44	GLS REF PATH IDENT
5.80	GLS CAT
	(blank)
5.16	CONT NR
5.245	GLS CHANNEL
5.46	RUNWAY IDENT
	(blank)
5.47	GLS APP BEARING
5.36	STATION LATITUDE
5.37	STATION LONGITUDE
5.244	GLS IDENT
	(blank)
5.245	SVC VOL RADIUS
5.246	TDMA SLOTS
5.52	MIN ELEV ANG
5.39	MAG VAR
	RESERVED
5.74	STATION ELEVATION
5.197	DATUM CODE
5.247	STATION TYPE
	(blank)
5.248	STATION ELEVATION (WGS-84)
	(blank)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

ARINC 424 - 15 RECORD FORMAT

ALTERNATE RECORD (RA) 4.1.30.1 PRIMARY

5.2	5.3	5.4	5.5	5.75	5.14	5.4	5.5	5.250		5.251	5.252	5.253		5.251	5.252	5.253		5.251	5.252	5.253		5.251	5.252	5.253		5.251	5.252	5.253		5.251	5.252	5.253		5.31	5.32
S/T	CUST/ AREA	SEC CODE	SUB CODE	ALTERNATE/ RELATED ARPT OR FIX	ICAO CODE	SEC CODE	SUB CODE	ART		DTA	ALT TYPE	ALT IDENT		DTA	ALT TYPE	ALT IDENT ONE		DTA	ALT TYPE	ALT IDENT TWO		DTA	ALT TYPE	ALT IDENT THREE		DTA	ALT TYPE	ALT IDENT FOUR		DTA	ALT TYPE	ALT IDENT FIVE	RESERVED EXPANSION	FILE RECORD NUMBER	CYCLE

HELIPORT (HA) 4.2.1.1 PRIMARY

5.2	5.3	5.4		5.6	5.14	5.5	5.107	5.180	5.16	5.73	5.197	5.108		5.36	5.37	5.39	5.55	5.72	5.23	5.14	5.53	5.53	5.177	5.178	5.179	5.176	5.165		5.71	5.31	5.32
S/T	CUST/ AREA	SEC CODE		HEPT IDENT	ICAO CODE	SUB CODE	ATA/ IATA	PAD IDENT	CONT NR	SPEED LIMIT ALTITUDE	DATUM CODE	IFR		LATITUDE	LONGITUDE	MAG VAR	ELEV	SPEED LIMIT	RECD VHF	ICAO CODE	TRANS ALTITUDE	TRANS LEVEL	PUB/MIL	TIME ZONE	DAY TIME	PAD DIMENSIONS	MT IND	RESERVED	HELIPORT NAME (30)	FILE RECORD NUMBER	CYCLE

NOTES:

HELIPORT (HA) 4.2.1.2 CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16		5.61		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR		NOTES ON CONTINUATION RECORD (69)	RESERVED (31)	FILE RECORD NUMBER	CYCLE

NOTES:

HELIPORT (HA) 4.2.1.3 FLIGHT PLANNING CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16	5.91	5.116	5.116	5.152	5.153		5.217	5.6	5.14		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	USER	FIR IDENT	UIR IDENT	S/E IND	START/END DATE	RESERVED (23)	AS IND	AS ARPT IND	AS ICAO CODE	RESERVED (50)	FILE RECORD NUMBER	CYCLE

NOTES:

HELIPORT (HA) 4.2.1.4 FLIGHT PLANNING CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16	SAME PARAGRAPH AS PRIMARY RECORD (4.2.1.1)	5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	CONTINUATION RECORD SAME AS PRIMARY RECORD (4.2.1.1)	FILE RECORD NUMBER	CYCLE

NOTES:

HELICOPTER TERMINAL WAYPOINT (HC) 4.2.2.1 PRIMARY

5.2	5.3	5.4		5.41	5.14	5.5	5.13		5.14	5.16		5.42	5.82		5.36	5.37		5.39	5.XXX	5.197		5.196	5.43	5.31	5.32
S/T	CUST/ AREA	SEC CODE		HELIPORT IDENT	ICAO CODE	SUB CODE	WAYPOINT IDENT		ICAO CODE	CONT NR		TYPE	USAGE		LATITUDE	LONGITUDE		D MAG VAR	WP ELEV (REST FOR SIM)	DATUM CODE		NAME IND	NAME/DESC (25)	FILE RECORD NUMBER	CYCLE

NOTES:

HELICOPTER TERMINAL WAYPOINT (HC) 4.2.2.2 CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16		5.61		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR		NOTES ON CONTINUATION RECORD (69)	RESERVED (31)	FILE RECORD NUMBER	CYCLE

NOTES:

HELICOPTER TERMINAL WAYPOINT (HC) 4.2.2.3 FLIGHT PLANNING CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16	5.91	5.116	5.116	5.152	5.153		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	USER	FIR IDENT	UIR IDENT	S/E IND	START/END DATE	RESERVED (81)	FILE RECORD NUMBER	CYCLE

NOTES:

HELICOPTER TERMINAL WAYPOINT (HC) 4.2.2.4 FLIGHT PLANNING CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16	SAME PARAGRAPH AS PRIMARY RECORD (4.2.2.1)	5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	CONTINUATION RECORD SAME AS PRIMARY RECORD (4.2.2.1)	FILE RECORD NUMBER	CYCLE

NOTES:

4.0 NAVIGATION DATA - RECORD LAYOUT (cont'd)

ARINC 424 - 15 RECORD FORMAT

HELIPORT SIDS/STARS/APPROACH (HD/HE/HF) 4.2.3.1 PRIMARY

Ref.	Field
5.2	S/T
5.3	CUST/AREA
5.4	SEC CODE
5.6	HELIPORT IDENT
5.14	ICAO CODE
5.5	SUB CODE
5.9 & 5.10	SID/STAR/APP IDENT
5.7	RT TYPE
5.11	TRANS IDENT
5.12	SEQ NR
5.13	FIX IDENT
5.14	ICAO CODE
5.4	SEC CODE
5.5	SUB CODE
5.16	CONT NR
5.17	DESC CODE
5.20	TURN DIR
5.211	RNP
5.21	PATH TERM
5.22	TDV
5.23	RECD NAVAID
5.14	ICAO CODE
5.204	ARC RADIUS
5.24	THETA
5.25	RHO
5.26	MAG CRS
5.27	RTE DIST HOLD DIST/TIME
5.4	SEC CODE
5.5	SUB CODE
	RESERVED
5.29	ALT DESC
5.81	ATC
5.30	ALTITUDE
5.30	ALTITUDE
5.53	TRANS ALTITUDE
5.72	SPEED LIMIT
5.70	VERT ANGLE
5.144	CENTER FIX
5.130	MULTI CD
5.14	ICAO CODE
5.4	SEC CODE
5.5	SUB CODE
5.222	GPS/FMS IND
5.7	RTE QUAL1
5.7	RTE QUAL2
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

HELIPORT SIDS/STARS/APPROACH (HD/HE/HF) 4.2.3.2 CONTINUATION

Ref.	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.170	CAT A DH
5.170	CAT B DH
5.170	CAT C DH
5.170	CAT D DH
5.171	CAT A MDH
5.171	CAT B MDH
5.171	CAT C MDH
5.171	CAT D MDH
5.242	PROC CAT
5.211	RNP
	RESERVED (26)
5.7	RTE QUAL1
5.7	RTE QUAL2
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

HELIPORT SIDS/STARS/APPROACH (HD/HE/HF) 4.2.3.3 FLIGHT PLANNING CONTINUATION

Ref.	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.91	USER
5.152	S/E IND
5.153	START/END DATE
5.27	RTE DIST
	RESERVED (45)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

HELIPORT SIDS/STARS/APPROACH (HD/HE/HF) 4.2.3.4 FLIGHT PLANNING CONTINUATION

Ref.	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
SAME PARAGRAPHS AS PRIMARY RECORD (4.2.3.1)	CONTINUATION RECORD SAME AS PRIMARY RECORD (4.2.3.1)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

HELIPORT MINIMUM SECTOR ALTITUDE (MSA) (HS) 4.2.4.1 PRIMARY

Ref.	Field
5.2	S/T
5.3	CUST/AREA
5.4	SEC CODE
5.6	ARPT IDENT
5.14	ICAO CODE
5.5	SUB CODE
5.144	MSA CENTER
5.14	ICAO CODE
5.4	SEC CODE
5.5	SUB CODE
5.130	MULTI CD
	RESERVED (15)
5.16	CONT NR
5.145	RADIUS LIMIT
5.146	SEC BRG
5.147	SEC ALT
5.146	SEC BRG
5.147	SEC ALT
5.146	SEC BRG
5.147	SEC ALT
5.146	SEC BRG
5.147	SEC ALT
5.146	SEC BRG
5.147	SEC ALT
5.165	MAT IND
	RESERVED (50)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

HELIPORT MINIMUM SECTOR ALTITUDE (MSA) (HS) 4.2.4.2 CONTINUATION

Ref.	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.61	NOTES ON CONTINUATION RECORD (85)
	RESERVED (14)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

HELIPORT COMM (HV) 4.2.5.1 PRIMARY

Ref.	Field
5.2	S/T
5.3	CUST/AREA
5.4	SEC CODE
5.6	HEPT IDENT
5.14	ICAO CODE
5.5	SUB CODE
5.101	COMM TYPE
5.103	COMM FREQ
5.182	G/T
5.104	FREQ UNIT
5.16	CONT NR
5.106	SERV IND
5.102	RADAR
5.198	MODULAT
5.199	SIG EM
5.36	LATITUDE
5.37	LONGITUDE
5.39	MAG VAR
5.92	FAC ELEV
5.181	H24 IND
5.183	SECTOR
5.29	ALT DESC
5.184	ALTITUDE 1
5.184	ALTITUDE 2
5.185	SECTOR FAC
5.14	ICAO CODE
5.4	SEC CODE
5.5	SUB CODE
5.187	DIST DESC
5.188	COMM DIST
5.200	REMOTE FAC
5.14	ICAO CODE
5.4	SEC CODE
5.5	SUB CODE
5.105	CALL SIGN (25)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

HELIPORT COMM (HV) 4.2.5.2 CONTINUATION

Ref.	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.186	NARRATIVE (60)
	RESERVED (35)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

HELIPORT COMM (HV) 4.2.5.3 CONTINUATION

Ref.	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.131	TIME CD
5.132	NOTAM
5.138	TIME IND
5.195	TIME OF OPERATION
5.195	TIME OF OPERATION
5.195	TIME OF OPERATION
5.195	TIME OF OPERATION
5.195	TIME OF OPERATION
5.195	TIME OF OPERATION
5.195	TIME OF OPERATION
	RESERVED (23)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

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5.0 NAVIGATION DATA - FIELD DEFINITIONS

5.1 General

Chapter 5 sets forth definitions/descriptions and content for each type of field employed in the records discussed in Chapter 4. The following information is presented for each field:

(i) Field Name (paragraph heading)
(ii) Abbreviation used in proportional record layouts (Chapter 4) when different than Field Name (follows paragraph heading)
(iii) Field Definition/Description
(iv) Source/Content of each field
(v) Length of field, expressed in number of characters
(vi) Type of character allowed in each field, alpha or numeric or alpha/numeric
(vii) Examples of field content when appropriate and/or necessary

The following general rules apply to the format of all the fields:

(i) All numeric fields, and the numeric parts of latitude, longitude, magnetic variation, negative elevation and station declination fields will be right justified and filled with leading zeros.
c-10 (ii) All alpha and alpha/numeric fields will be left justified.
(iii) Allowable field content of blank is defined as alpha/numeric content.

5.2 Record Type (S/T)

Definition/Description: The "Record Type" field content indicates whether the record data are "standard," i.e., suitable for universal application, or "tailored," i.e. included on the master tape for a single user's specific purpose. (Section 1.2 of this Specification refers.)

Source/Content: The field contains the letter "S" when the field data are "standard" and the letter "T" when they are "tailored."

Used On: All records
Length: One character
Character Type: Alpha

5.3 Customer/Area Code (CUST/AREA)

Definition/Description: The "Customer Area Code" field permits the categorization of standard records by geographical area and of tailored records by the c-13 airlines for whom they are provided in the master file. Several record types do not adhere to the established geographical boundaries. There is no "AREA" in such records.

Source/Content: "AREA" Codes should be derived from Figure 5-2. Airline codes should be derived from the standard list of abbreviated identifiers maintained and published in the IATA Airline Coding Directory. On Company Route and Preferred Route Records, an additional AREA field is used as a pointer to the AREA in which the Route Segment is located. For records, which do not follow geographical boundaries, the field is blank. For Preferred Routes, the field content is "PDR".

Used On: All records with content as defined above. c-13
Length: 3 characters max
Character Type: Alpha
Examples: Areas - USA, CAN, EUR
Customer - UAL, DAL, TWA
Preferred Routes - PDR

5.4 Section Code (SEC CODE)

Definition/Description: The "Section Code" field defines the major section of the navigation system data base in which the record resides. c-10

Source/Content: Figure 5-1 shows the data base section encoding scheme.

Used On: All records
Length: One character
Character Type: Alpha

5.5 Subsection Code (SUB CODE)

Definition/Description: The "Subsection Code" field defines the specific part of the database major section in which the record resides. c-13

Additionally, records that reference other records within the database use Section/Subsection Codes to make the reference, together with the record identifier. This is true for "fix" information in Holdings, Enroute Airways, Airport and Heliport SID/STAR/APPROACH, all kinds of Communications, Airport and Heliport MSA, Company Routes, Enroute Airway Restrictions, Preferred Routes and c-14 Alternate Records. The Section Code will define the major database section, the Subsection Code permits the exact section (file) to be identified and the "fix" (record) can then be located within this file.

Source/Content: Figure 5-1 shows the database Subsection Encoding Scheme.

Used On: All records c-5
Length: One character
Character Type: Alpha

5.0 NAVIGATION DATA - FIELD DEFINITIONS (cont'd)

5.5 Subsection Code (SUB CODE) (cont'd)

	Section Code	Section Name	Subsection Code	Subsection Name
c-10	A	MORA	S	Grid MORA
c-14	D	Navaid	Blank	VHF Navaid
			B	NDB Navaid
	E	Enroute	A	Waypoints
			M	Airway Markers
			P	Holding Patterns
c-13			R	Airways and Routes
			T	Preferred Routes
			U	Airway Restrictions
			V	Communications
	H	Heliport	A	Pads
			C	Terminal Waypoints
c-14			D	SIDs
			E	STARs
			F	Approach Procedures
			S	MSA
			V	Communications
	P	Airport	A	Reference Points
			B	Gates
			C	Terminal Waypoints
			D	SIDs
			E	STARs
c-10			F	Approach Procedures
			G	Runways
			I	Localizer/Glide Slope
			L	MLS
			M	Localizer Marker
			N	Terminal NDB
			P	Pathpoint
			R	Flt Planning ARR/DEP
c-14			S	MSA
			T	GLS Station
			V	Communications
	R	Company Routes	Blank	Company Routes
			A	Alternate Records
c-13	T	Tables	C	Cruising Tables
			G	Geographical Reference
	U	Airspace	C	Controlled Airspace
c-5			F	FIR/UIR
			R	Restrictive Airspace

Figure 5-1
Section and Subsection Encoding Scheme

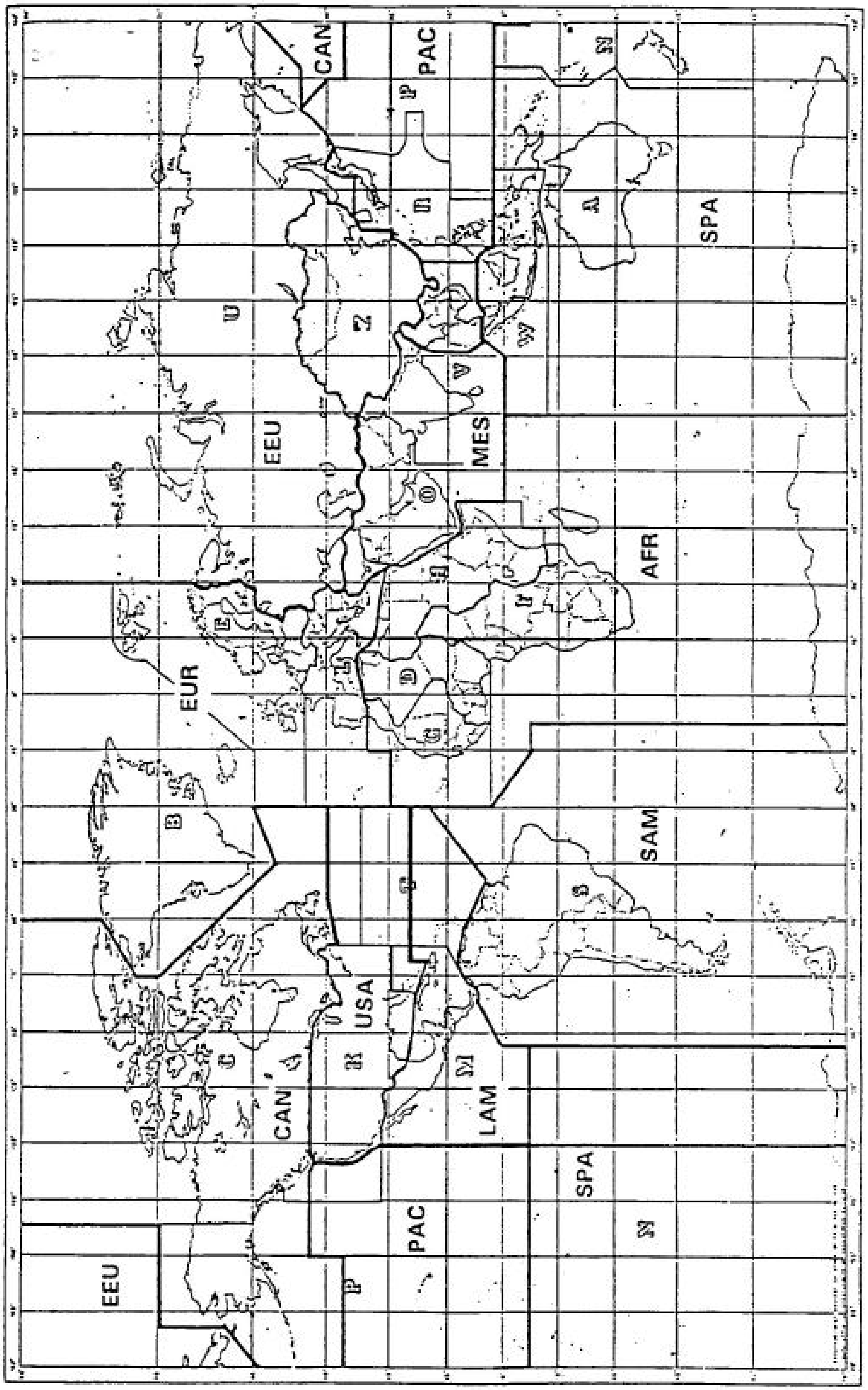

Figure 5-2
Geographical Area Codes

5.6 Airport/Heliport Identifier (ARPT/HELI IDENT)

Definition/Description: The "Airport Identifier" and the "Heliport Identifier" fields contain the identification of the airport or heliport to which the data contained in the record relates.

Source/Content: The content of this field is derived from official government sources. It will be the four character ICAO Location Identifier of the airport or heliport when such is published. It will be the three or four character Domestic Identifier when published and no ICAO Location Identifier is available for the airport or heliport. When used on Airport or Heliport Flight Planning Continuation Records, it will be the Airport or Heliport Identifier owning the terminal controlled airspace referenced in that record. c-13

Note: Within the continental United States and within Canada, in addition to using the published four character ICAO Location Identifiers, data suppliers append the character "K" for the USA or "C" for Canada to certain Domestic Identifiers to present an ICAO look-alike four character identifier.

COMMENTARY

Where no officially published identifier is available, a data supplier may create a unique, temporary and unofficial identifier. Airports or Heliports within such identifiers may supply Tailored Data only and with full knowledge and concurrence of the data user. Whenever possible, such temporary identifiers should be coordinated among the various data suppliers prior to its release.

The content of this Airport/Heliport Identifier should not be confused with the perhaps more familiar ATA/IATA two or three character identifiers often user by airlines for other than navigation purposes. These ATA/IATA identifiers are included in the ARINC 424 database in accordance with Section 5.107 of this Specification.

Used On: Airport Identifier - VHF Navaid, NDB Navaid, Airport Terminal Waypoint, Airport, Airport Gate, Airport SID/STAR/Approach, Runway, Airport and Heliport Localizer, Airport and Heliport Localizer Marker, Holding Pattern, Airport Communications, Airport and Heliport MLS, GLS Airport MSA, Path Point Flight Planning Arrival Departure Data and GLS Record. c-14

Heliport Identifier - VHF Navaid, NDB Navaid, Heliport Terminal Waypoint, Heliport, Heliport SID/STAR/Approach, Airport and Heliport Localizer, Airport and Heliport Localizer Marker, Holding Pattern, Heliport Communications, Airport and MLS, GLS Heliport MSA, Path Point Flight Planning Arrival/Departure Data and GLS Records.

Length: 4 characters maximum
Character Type: Alpha/numeric
Examples: KJFK, DMIA, 9Y9, CYUL, EDDF, 53Y, CA14 c-13

5.7 Route Type (RT TYPE)

Definition/Description: The "Route Type" field defines the type of Enroute Airway, Preferred Route, Airport and Heliport SID/STAR/Approach Routes of which the record is an element. For Airport and Heliport Approach Routes, "Route Type" includes a "primary route type," and up to two "route type qualifiers." c-14

Source/Content: The content of this field will be as indicated in the following tables:

Enroute Airway Records (ER)

Airway Type	Field Content
Airline Airway (Tailored Data)	A
Control	C
Direct Route	D
Helicopter Airways	H
Officially Designated Airways, except RNAV, Helicopter Airways	O
RNAV Airways	R
Undesignated ATS Route	S

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Preferred Route Records (ET)

Route Type Description	Field Content
North American Routes for North Atlantic Traffic	C
Common Portion	
Preferential Routes	D
Pacific Oceanic Transition Routes (PACOSTS)	J
TACAN Routes – Australia	M
North American Routes for North Atlantic Traffic – Non-common Portion	N
Preferred/Preferential Overflight Routes	0
Preferred Routes	P
Traffic Orientation System Routes (TOS)	S
Tower Enroute Control Routes (TEC)	T

c-13

5.0 NAVIGATION DATA - FIELD DEFINITIONS (cont'd)

Airport SID (PD) and Heliport SID (HD) Records

SID Route Type Description	Field Content
Engine Out SID	0
SID Runway Transition	1
SID or SID Common Route	2
SID Enroute Transition	3
RNAV SID Runway Transition	4
RNAV SID or SID Common Route	5
RNAV SID Enroute Transition	6
FMS SID Runway Transition	F
FMS SID or SID Common Route	M
FMS SID Enroute Transition	S
Vector SID Runway Transition	T
Vector SID Enroute Transition	V

Airport STAR (PE) and Heliport STAR (HE) Records

STAR Route Type Description	Field Content
STAR Enroute Transition	1
STAR or STAR Common Route	2
STAR Runway Transition	3
RNAV STAR Enroute Transition	4
RNAV STAR or STAR Common Route	5
RNAV STAR Runway Transition	6
Profile Descent Enroute Transition	7
Profile Descent Common Route	8
Profile Descent Runway Transition	9
FMS STAR Enroute Transition	F
FMS STAR or STAR Common Route	M
FMS STAR Runway Transition	S

Airport Approach (PF) and Heliport Approach (HF) Records

Approach Route Type Description	Route Type Field Content	Qualifier 1 Field Content	Qualifier 2 Field Content	
Approach Transition	A			
Localizer/Backcourse Approach	B			
RNAV, GPS Required Approach	E			
Flight Management System (FMS) Approach	F			
Instrument Guidance System (IGS) Approach	G			
Instrument Landing System (ILS) Approach	I			
LAAS-GPS/GLS Approach Note 2	J			
WAAS-GPS Approach Note 2	K			
Localizer Only (LOC) Approach	L			
Microwave Landing System (MLS) Approach	M			
Non-Directional Beacon (NDB) Approach	N			
Global Positioning System (GPS) Approach	P			
Area Navigation (RNAV) Approach (Note 1)	R			c-14
TACAN Approach	T			
Simplified Directional Facility (SDF) Approach	U			
VOR Approach	V			
Microwave Landing System (MLS), Type A Approach	W			
Localizer Directional Aid (LDA) Approach	X			
Microwave Landing System (MLS), Type B and C Approach	Y			
Missed Approach	Z			
DME Required for Procedure		D		
DME Not Required for Procedure		N		
DME/DME Required for Procedure		T		
Primary Missed Approach		P		
Secondary Missed Approach		S		c-15
Procedure with Circle-To-Land Minimums			C	
Procedure with Straight-in Minimums			S	c-14
Procedure Designed for Helicopter to Runway			H	

The listing above for Approach Route Type is alphabetical and does not represent any kind of priority.

5.7 Route Type (RT TYPE) (cont'd)

Note 1: Conventional Area Navigation Approach using RHO-RHO or RHO-THETA equipment.

c-14 Note 2: Path Point Data Records are required to support these Approach Procedure Types.

Note 3: The Qualifiers 1 (values "D," "N," and "T" and 2 (all values) can be used in conjunction with any Route Type except for "A" and "Z".

c-15 Qualifier 1 values "P" and "S" can be used only in conjunction with Route Type "Z".

Note 4: The content of this Route Type is split in the record layout. The Primary Route Type is in column 20 and the Qualifiers 1 and 2 in columns 119 and 120. Only the Primary Route Type is used to sort the file content

Note 5: Approach Procedures designed for helicopter operations to helipads, previously designated with a Route Type of "H," are now identified by Route Types in this table and the fact that they are provided as "HF" records. Procedures

c-14 designed for helicopter operations to runways use the Route Types in this Table and the "H" in Qualifier 2.

Used On:	Enroute Airways, Airport and Heliport SID/STAR/Approach, Preferred Route
Length:	One for Enroute Airways, Airport and Heliport SID and STAR and Preferred Routes. Three for Airport and Heliport Approach Procedures
Character Type:	Alpha/Numeric
Approach Examples:	LDC = a Localizer-based procedure, for localizer only, no glide slope, with DME required, Circle-To-Land Minimums V S = A VOR procedure, using VORDME or VORTAC Navaid, DME not required, Straight-in Minimums VDS = A VOR procedure DME required straight-in minimums.

5.8 Route Identifier (ROUTE IDENT)

Definition/Description: The "Route Identifier" field identifies a route of flight or traffic orientation, using the coding employed on aeronautical navigation charts and related publications.

c-13 Source/Content: For Enroute Airways, Route Identifier codes should be derived from official government publications. For Preferred Routes, Route Identifiers may or may not be provided in government publications. Where they are available, they will be used.

For North American Routes for North Atlantic Traffic, "Common Portion" and other similar route system, route identifier code shall be those published in government sources. For the European Traffic Orientation System or other similar route systems such as North American Routes for North Atlantic Traffic, "Non-common Portion," Preferred Routes and Preferential Routes published without official and/or flight plan identifiers, but published as between specific airports or other navigation fixes, route identifiers define the initial fix and the terminus fix idents according to the naming rules in Chapter 7. For routings which do not include a unique initial or terminus fix, rules on creating unique Route Identifiers are also contained in Chapter 7. Those rules have been developed with use of the Geographical Reference Tables (TG). Refer to Chapter 3, Section 3.2.7.2 and Chapter 4, Section 4.1.26 for more detail. c-13 c-14

Used On:	Enroute Airway, Preferred Route Records and Geographical Reference Table
Length:	Enroute Airway - 5 character maximum Preferred Route - 10 character maximum
Character Type:	Alpha/Numeric
Examples:	Enroute Airway - V216, C1150, J380, UA16, UB414 Preferred Routes - N111B, TOS13, TOS14WK, CYYLCYYC, ARTCOLAR, KZTLKSAV, SCNDICANRY

c-13

Refer to Section 7 for specific examples and their meaning.

5.9 SID/STAR Route Identifier (SID/STAR IDENT)

Definition/Description: "The SID/STAR Route Identifier" field contains the name of the SID or STAR, using the basic indicator, validity indicator and route indicator abbreviated to six characters with the naming rules in Chapter 7 of this document. c-9

Source/Content: SID/STAR route identifier codes should be derived from official government publications describing the terminal procedures structure. c-5

Used On:	Airport SID/STAR, Heliport SID/STAR and Flight Planning Arrival/Departure Data Records c-14
Length:	6 characters max
Character Type:	Alpha/numeric c-1
Examples:	DEPU2, SCK4, TRP7, 41M3, MONTH6

5.10 Approach Route Identifier (APPROACH IDENT)

Definition/Description: The "Approach Route Identifier" field contains the identifier of the approach route to be flown. To facilitate the provision of multiple approach procedures of the same type to a given runway, the field also is used to provide a "multiple indicator."

Source/Content: For approach procedures coded to a specific runway for airport approaches, the first position of the identifier will carry a character indicating the type of approach. The second through fourth characters will carry the runway identification and the fifth character will carry the multiple indicator, where appropriate. For approach procedures coded with only circle-to-land minimums and not runway dependent, allow a four character alpha identifier. The fifth character will carry the multiple indicator on airport approaches, where appropriate. Other identifiers may be used for circle-to-land approach procedures, applying as much of the source ident as possible. To ensure that any possible multiple indicator is always located in the fifth position of the identifier, the fourth position may contain a dash (-) when the runway designation being used does not include a Left, Right, Center or True indication.

For Helicopter Approach Procedure to Runways, the first position of the identifier will be the type of approach. The second through fourth positions will carry a three digit numeric representing the procedure final approach course, expressed in full degrees. Where the same final approach course is used multiple times in official source, the fifth position will carry a multiple indicator.

For Helicopter Approach Procedures to Heliports and coded to a specific pad, the first position of the identifier will carry a character indicating the type of approach. The second through sixth characters will carry the pad identification. There is no provision for a multiple indicator for more than one approach of the same type to the same pad in this identifier field. When required, a multiple indicator is provided in a separate field.

Used On:	Airport and Heliport Approach Route Records, Flight Planning Arrival/Departure Data, Path Point and Airport, Heliport Localizer Simulation Continuation Records.
Length:	6 characters max.
Character Type:	Alpha/Numeric
Examples:	
Runway Dependent	I26L, B08R, R29, V01L, N35 L16RA, L16RB, V08-A, V08-B
Circle-To-Land	VORA, NDBB, CVOR, VDMA, LOCD CVORA, CVORB, I18L1, I18L2
Helicopter to Runway	L040, V175, N175B
Helicopter to Helipad	IA127, VBRAVO, N23, RWESTA

5.11 Transition Identifier (TRANS IDENT)

Definition/Description: The "Transition Identifier" field describes the type of transition to be made from the enroute environment into the terminal area and vice versa, and from the terminal area to the approach or from the runway or helipad to the terminal area.

Source Content: The content of the transition identifier field should be determined from the content of the Route Type field (See Section 5.7) in accordance with the rules set forth in Figure 5.3

5.0 NAVIGATION DATA - FIELD DEFINITIONS (cont'd)

5.11 Transition Identifier (TRANS IDENT) (cont'd)

c-14

Record	Route Type	Field Content
Engine Out SID	0	Runway (RWY) or Pad Identifier
SID/RNAV SID	1 or 4	Runway (RWY) or Pad Identifier
	2 or 5	Blank/RWY/PAD/ALL (see Notes 1 and 3)
	3 or 6	SID Enroute Transition Identifier
FMS SID	F	Runway (RWY) or Pad Identifier
	M	Blank/RWY/PAD/All (see Notes 1 and 3)
	S	FMS SID Enroute Transition Identifier
Vector SID	T	Runway (RWY) or Pad Identifier
	V	Vector SID Enroute Transition Identifier
STAR/RNAV STAR	1 or 4	STAR Enroute Transition Identifier
	2 or 5	RWY/PAD/ALL/Blank (see Note 3)
	3 or 6	Runway (RWY) or Pad Identifier (Note 2)
Profile Descent	7	Profile Descent Enroute Transition Ident
	8	RWY/PAD/ALL/Blank (see Note 3)
	9	Runway (RWY) or Pad Identifier (Note 2)
FMS STAR	F	FMS STAR Enroute Transition Identifier
	M	RWY/PAD/ALL/Blank (See Note 3)
	S	Runway (RWY) or Pad Identifier (Note 2)
Approach Transitions	A	Approach Transition Identifier
Missed Approach	Z	Missed Approach Transition Identifier (Note 4)
Approach Procedure	All Other Codes (see Section 5.7)	Blank

c-15

c-14

Figure 5-3
Transition Identifier Field Content

c-13

Note 1: If there is no Route Type 1 or 4 or F for the SID, then the SID records with the Route Type of 2 or 5 or M will have an entry in the Transition Identifier field. If there is a Route Type of 1 or 4 or F for the procedure, then the records with the Route Type of 2 or 5 or M will carry a blank transition identifier field.

Note 2: If there is no Route Type 3 or 6 or 9 or S for the STAR, then the STAR record with the Route Type of 2 or 5 or 8 or M will have an entry in the Transition Identifier field. If there is a Route Type 3 or 6 or 9 or S for the procedure, then the Transition Identifier in the Route Type 2 or 5 or 9 or M will carry a blank transition identifier field.

c-14 Note 3: The use of "ALL" in the Transition Identifier field indicates that the procedure is valid for two or more runways at an airport or all helipads at a heliport. The use of the character "B" along with a runway designation such as RW08B in the Transition Identifier field indicates that the transition is valid for two or more parallel runways, e.g. RW08L and RW08R.

c-13

Note 4: The Missed Approach Transition Identifier will be the identifier of the Missed Approach Holding Fix or the last fix in the missed approach path if there is no holding fix. If multiple missed approach paths are published to the same termination but with different paths or constraints, a transition identifier closely aligned with the published source indication for each missed approach will be used. c-15

Enroute Transition Identifiers are normally the identifier of a navaid or waypoint. Transition Identifiers should be derived from official government sources, where provided.

c-14

Used On: Airport and Heliport SID/STAR/ Approach, Flight Planning Arrival/Departure Data and Company Route Records
Length: 5 characters max.
Character Type: Alpha/numeric
Examples: 9TU, ETX, KEENE, DEN, RW08R, Blank c-7

5.12 Sequence Number (SEQ NR)

Definition/Description: For Route Type Records - A route of flight is defined by a series of records taken in order. The "Sequence Number" field defines the location of the record in the sequence defining the route of flight identified in the route identifier field. For Boundary Type Records - A boundary is defined by a series of records taken in order. The "Sequence Number" field defines the location of the record in the sequence defining a boundary. For Record Types requiring more than one primary record to define the complete content - In a series of primary records used to define a complete condition, the "Sequence Number" is used to define each primary record in sequence.

Source/Content: Sequence numbers are assigned during the route, boundary or sequence definition phase of the data file assembly. Sequence numbers are assigned so as not be duplicated within the route, boundary or sequence assigned a unique identification/designation. For three or four digit Sequence Numbers, initially, an increment of ten should be maintained between the sequence numbers assigned to consecutive records. For one or two digit Sequence Numbers, the initial increment is one. In route or boundary records, should subsequent maintenance of the file necessitate the addition of a record or records, the new record(s) should be located in the correct position in the sequence and assigned a sequence number whose most significant characters are identical to those in the sequence number of the preceding record in sequence. The unit character should be assigned a value midway between the units character values of the preceding and following record sequence numbers. For example, if it is desired to add one record to the sequence and the units characters of both the preceding and following records at the desired location are zeros (indicating no previous modification at this point), the units character or the inserted record's sequence number should be five (5). For records taken in sequence with one or two digit sequence numbers, additional data must be entered in the proper sequence and all subsequent records will be up numbered accordingly. c-12

5.0 NAVIGATION DATA - FIELD DEFINITIONS (cont'd)

c-12 When an enroute airway crosses the boundary separating two geographical areas (Section 5.3), the airway fix lying on or closest to the boundary shall be coded twice, once for each geographical area, and should be assigned the same sequence number in each case. Record uniqueness in such cases is maintained through the "Boundary Code" (Section 5.18). Enroute airway record sequence numbers should be assigned in a manner which permits them to be arranged into continuous airway routes in flight sequence order when sorted according to the Route Identifier and Sequence Number only, without regard to their applicable Geographical Area Code.

c-13

Used On:	Enroute Airways, Airport and Heliport SID/STAR/Approach, Company Route, Cruise Tables, FIR/UIR, Restrictive Airspace, Controlled Airspace, Preferred Routes, Flight Planning Arrival/Departure Data and VHF Navaid Limitation Continuation Records
Length:	4 characters - Enroute Airways, Preferred Routes, FIR/UIR and Restrictive Airspace 3 characters - SID/STAR/Approach and Company Routes 2 characters - VHF Navaid Limitation Continuation Records 1 character - Cruise Table
Character Type:	Numeric
Examples:	0010, 0135, 2076, 120, 030, 01, 84, 3

5.13 Fix Identifier (FIX IDENT)

Definition/Description: The "Fix Identifier" field contains the five-character-name-code, or other series of characters, with which the fix is identified. This includes Waypoint Identifiers, VHF NAVAID Identifiers, NDB NAVAID identifier, Airport Identifiers, and Runway Identifiers.

Source/Content: Officially published identifiers or identifiers derived in accordance with Chapter 7, Naming Conventions, of this document.

c-10

Used On:	Holding Patterns, Enroute Airways, Airport and Heliport SID/STAR/ Approach, Enroute Airway Restrictions, and Enroute Waypoints, Airport and Heliport Terminal Waypoints (Waypoint Ident) and Flight Planning Arrival/Departure Data Records.
Length:	5 characters max
Character Type:	Alpha/numeric (no embedded blanks)
Examples:	SHARP, DEN43, BHM, RW27L, KGRR

5.14 ICAO Code (ICAO CODE)

Definition/Description: The "ICAO Code" field permits records to be categorized geographically within the limits of the categorization performed by the "Area Code" field.

Source/Content: The code is to be employed in the ICAO code field may be found in ICAO Document No. 7910, "Location Indicators."

In order to permit sub-division of the United States into more easily manageable regions, the ICAO code for the USA (K) is followed by a numeric character obtained from Figure 5-5. c-10

Used On:	All records except Cruising Tables and Grid MORA
Length:	2 characters max
Character Type:	Alpha/numeric
Examples:	K1,K7,PA,MM,EG,UT

5.15 Intentionally Left Blank c-9

5.16 Continuation Record Number (CONT NR)

Definition/Description: When it is not possible to store all the information needed on a record within the 132 columns of the record itself, the so-called Primary Record; one or more continuation records may be used. The "Continuation Record Number" identifies the position of a continuation record in a sequence of such records.

Source/Content: Primary records contain the numeric "0" when no Continuation Records are included in the file for that Primary. The numeric "1" in this field of the Primary Record indicates that one or more Continuation Records follow the Primary Record. Continuation Records are numbered sequentially starting with the numeric "2" in the first continuation. If the information requirement goes beyond a Continuation Record with the numeric "9," the sequence is continued with alpha characters, starting with "A" and continuing through to "Z" as required. c-10

Used On:	All records except Company Route, Airport Localizer Marker/Locator, Enroute Markers, Cruising Tables, FIR/UIR and Grid MORA c-5
Length:	One character c-10
Character Type:	Alpha/Numeric
Examples:	0, 1, 2 (through 9) A, B, C (through Z)

5.17 Waypoint Description Code (DESC CODE)

Definition/Description: Fixes are located at positions significant to navigation in the Enroute, Terminal Area and Approach Procedure path definitions. The "Waypoint Description Code" field enables that significance or function of a fix at a specific location in a route to be identified. The field provides information on the type of fix. As a single fix can be used in different route structures and multiple times within a given structure, the field provides the function for each occurrence of a fix. c-13

Source/Content: Valid contents for the "Waypoint Description Code" are contained in the table below. The contents of Column 40 provide information on the fix type. Column 41 is used to define whether the fix is a "fly-over" or "fly-by" fix and to indicate the charting status of some waypoints. Columns 42 and 43 provide the fix function information. Column 40, Code "G," is valid for Runway as Waypoint and Helipad as Waypoint. c-14

5.0 NAVIGATION DATA - FIELD DEFINITIONS (cont'd)

5.17 Waypoint Description Code (DESC CODE) (cont'd)

c-14

Waypoint Description	Section / Subsection	COL	COL	COL	COL
Type/ Function	Used On	40	41	42	43
Airport as Waypoint	STAR, APCH	A			
Essential Waypoint[1]	Enroute, SID, STAR, APCH	E			
Off Airway Waypoint[2]	Enroute	F			
Runway as Waypoint, Helipad as Waypoint	SID, STAR, APCH	G			
Heliport as Waypoint	STAR, APCH	H			
NDB Navaid as Waypoint	Enroute, SID, STAR, APCH	N			
Phantom Waypoint[3]	SID, STAR, APCH	P			
Non-Essential Waypoint[4]	Enroute	R			
Transition Essential Waypoint[5]	Enroute	T			
VHF Navaid As Waypoint	Enroute, SID, STAR, APCH	V			
Flyover Waypoint, End of SID, STAR Route Type, APCH Transition or Final Approach[6]	SID, STAR, APCH		B		
End of Enroute Airway or Terminal Procedure Route Type	Enroute, SID, STAR, APCH		E		
Uncharted Airway Intersection[7]	Enroute		U		
Fly-Over Waypoint[8]	SID, STAR, APCH		Y		
Unnamed Stepdown Fix After Final Approach Fix[20]	APCH			A	
Unnamed Stepdown Fix Before Final Approach Fix[20]	APCH			B	
ATC Compulsory Waypoint [9]	Enroute			C	
Oceanic Gateway Waypoint[10]	Enroute			G	
First Leg of Missed Approach Procedure[11]	APCH			M	
Path Point Fix[19]	APCH			P	
Named Stepdown Fix[18]	APCH			S	
Initial Approach Fix[12]	APCH				A
Intermediate Approach Fix[13]	APCH				B
Initial Approach Fix with Holding	APCH				C
Initial Approach Fix with Final Approach Course Fix	APCH				D
Final End Point Fix[16]	APCH				E
Published Final Approach Fix or Database Final Approach Fix[14]	APCH				F
Holding Fix	Enroute SID, STAR, APCH				H
Final Approach Course Fix[15]	APCH				I
Published Missed Approach Point Fix[17]					M

Figure 5-4 Waypoint Description

Explanation of superscript notes and other detail required to understand this table:

1. Any waypoint (not Navaid, Airport or Runway) in Terminal Procedures or any waypoint (not Navaid) in Enroute Airways, required for navigation such as a change in bearing, intersection of two airways, beginning or end of continuous segment. See also Special Navigation Terms in Section 2.

2. Any waypoint published by government source but not part of any route structure. c-13

3. A waypoint established during procedure coding on the nominal track.

4. Any waypoint (not Navaid) on Enroute Airway that is not considered "Essential" or "Transition Essential." See also Special Navigation Terms in Section 2.

5. Any waypoint (not Navaid) on Enroute Airway for the purpose of transitioning between the Enroute and Terminal structures. See also Special Navigation Terms in Section 2.

6. Any waypoint (including Navaid) at the end of a SID or STAR Route Type, but not the final fix of the procedure, that must be overflown before establishing on the first leg of the following Route Type; at the end of an Approach Transition for FMS, GPS or MLS/RNAV approach prior to establishing on the final approach; any missed approach waypoint that is to be overflown during execution of the missed approach. c-14

7. Any waypoint (not Navaid) on Enroute Airway that has not been established by government source. Used only in conjunction with "E" in Column 40.

8. Any waypoint (including Navaid) that must be over flown before establishing on the following leg.

9. Any waypoint (including Navaid) on Enroute Airway at which a "position report" must be made to the appropriate Air Traffic Control unit. See also Special Navigation Terms in Section 2. c-13

10. Any waypoint (including Navaid) designated as the start/end of an oceanic organized track system. See also Special Navigation Terms in Section 2.

11. Coded on the first leg after a runway fix or missed approach point fix dependent on approach procedure coding rules in Attachment 5. The leg may be the first leg of a published missed approach procedure or a leg to the published missed approach point.

12. Any waypoint (including Navaid) established as an Initial Approach Fix. See also Special Navigation Terms in Section 2.

c-13

13. Any waypoint (including Navaid) established as an Intermediate Approach Fix and not coded as a Final Approach Course Fix. See also Special Navigation Terms in Section 2.

14. Any waypoint (including Navaid) established as a Final Approach Fix. This may be a fix published as the Final Approach Fix by government source or, when no such fix is published, one established by a data supplier according to the rules in Attachment 5. See also Special Navigation Terms in Section 2.

15. Any waypoint (including Navaid) established as a Final Approach Course Fix. This may be a fix published As the Final Approach Course Fix by government source or, when no such is published but yet required, one established by a data supplier according to the rules in Attachment 5. See also Special Navigation Terms in Section 2.

c-14

16. Any waypoint established as the Final End Point. This may be a fix published as the FEP by the government source or, when no such fix is published but yet required, one established by the data supplier. It is used in vertical coding of non-precision approach procedures. See also Special Navigation Terms in Section 2.

c-13

17. Any waypoint (including Navaid or Runway) established as a Missed Approach Point by government source. May follow a Runway Fix when such is required by the rule in Attachment 5. The code is used in conjunction with "G" in Column 40 when the Runway is the published Missed Approach Point.

c-14

18. Any waypoint established and named by the government source lying between the Final Approach Fix and the Missed Approach Point or between a published Final Approach Course Fix and a Final Approach Fix.

19. Any waypoint established by the government source in support of RNAV-GPS/GLS Approach Procedures. Path Points are not part of the defined procedure track but are provided in a separate record where required. The points are not named and are always referred to as Path Point 1 and Path Point 2.

20. Any published but unnamed waypoint lying between the Final Approach Fix and the Missed Approach Point (Code "A") or between the Final Approach Course Fix and the Final Approach Fix (Code "B")

c-13

Note 1: Column 40, the fix type column, may be blank when a particular leg of a procedure does not include a fix, such as those legs ending in intercepts or terminating altitudes. For more information on such legs, ref to the Leg Data Table in Attachment 5.

Note 2: With the rules provided for Columns 42 and 43, as further explained by references 11 and 17, it is possible to have the code "M" in both of the columns for one leg in cases where a runway fix which is not the designated missed approach point has been inserted into the procedure coding. c-13

Used On:	Airport and Heliport SID/STAR/Approach, Enroute Airway Records	c-14
Length:	Four Characters	
Character Type:	Alpha	

Figure 5-5
7 SUBDIVISIONS FOR UNITED STATES

5.0 NAVIGATION DATA - FIELD DEFINITIONS (cont'd)

5.18 Boundary Code (BDY CODE)

c-5 Definition/Description: Routes of flight frequently cross geographical boundaries. The "Boundary Code" field identifies the area from, or into which a continuous route passes when such a crossing occurs.

Source/Content: See Table 5-6.

Used On: Enroute Airways records
Length: One character
Character Type:

Area	Area Code*	Boundary Code
USA	USA	U
Canada and Alaska	CAN	C
Pacific	PAC	P
Latin America	LAM	L
South America	SAM	S
South Pacific	SPA	1
Europe	EUR	E
Eastern Europe	EEU	2
Middle East-South Asia	MES	M
Africa	AFR	A

c-9

From Figure 5-2

Table 5-6 - Boundary Codes

5.19 Level (LEVEL)

Definition/Description: The Level field defines the airway structure of which the record is an element.

Source/Content:

B	All Altitudes
H	High Level Airways
L	Low Level Airways

c-13

Used On: Enroute Airway, Preferred Routes, Restrictive Airspace, and Controlled Airspace records
Length: One character
Character Type:

5.20 Turn Direction (TURN DIR)

c-10 Definition/Description: The "Turn Direction" field specifies the direction in which Terminal Procedure turns are to be made. It is also used to indication direction on course reversals, see Attachment 5 Path and Termination.

Source/Content: The field contains the alpha character "L" for Left turns, "R" for Right turns and "E" for turns in either direction.

c-14 Used On: Airport and Heliport SID/STAR/Approach records
c-1 Length: One character
Character Type:

5.21 Path and Termination (PATH TERM)

Definition/Description: The Path and Termination defines the path geometry for a single record of an ATC terminal procedure. c-1

Source/Content: Attachment 5 to this document, "Path and Terminator," contains the various Path Term codes available for coding an ATC terminal procedure.

Used On: Airport and Heliport c-14
Alpha/numeric SID/STAR/Approach records
Length: 2 characters
Character Type: Alpha c-1

5.22 Turn Direction Valid (TDV)

Definition/Description: This field is used in conjunction with Turn direction to indicate that a turn is required prior to capturing the path defined in a terminal procedure. c-2

Source/Content: The field contains the alpha character "Y" when a turn is required prior to beginning the leg defined by the Path Term. The direction of the turn is specified in the Turn direction (5-20). c-1

Used On: Airport and Heliport SID/STAR/Approach Records c-14
Length: One character
Character Type: Alpha c-1

5.23 Recommended NAVAID (RECD NAV)

Definition/Description: The "Recommended Navaid" field allows the reference facility for the waypoint in a given record "Fix Ident" field or for an Airport or Heliport to be specified. VHF, NDB (Enroute and Terminal), Localizer, GLS and MLS Navaids may be referenced. c-13 c-14

Source/Content: The 1, 2, 3 or 4 character identification of the Navaid appears in this field. Navaids recommended for waypoint reference in official government publications will be used when available. The following general rules on field content apply:
Alpha

a. A "VHF Navaid" may be any VOR, DME, VORDME, VORTAC, TACAN or Un-Biased ILSDME available in the database.

b. A "NDB Navaid" may be any NDB or Locator (Terminal NDB) available in the database. c-13

c. Localizers, GLS Reference Path, and MLS Azimuth are used as Recommended Navaid for procedures that reference those navaids.

d. The Recommended Navaid in final approach procedure coding will be the procedure reference facility (when Recommended Navaid is provided in coding).

e. Alpha The Recommended Navaid in Airport and Heliport Records will be any VOR, VORDME or VORTAC available in the database.

5.23 Recommended NAVAID (RECD NAV) (cont’d)

c-13 f. The Recommended Navaid in any Enroute Airway Record will be any VORDME or VORTAC available in the database.

g. The Recommended Navaid in any Terminal Procedure Record other than the final approach coding will be the procedure reference facility of a type from the Definition/Description paragraph above and will be in accordance with the rules governing Recommended Navaids for Path Terminators and coding rule as defined in
c-14 Attachment 5 of this Specification.

h. The rules for Recommended Navaids for Converging ILS Approach Procedures are the same as for ILS Approach Procedures.

i. The Recommended Navaid used in a GLS Approach Procedure will be the GLS Ref Path identifier appropriate to the runway and approach.

Used On:	Enroute Airway Record, Airport and Heliport SID/STAR/Approach Records, Airport and Heliport Record
Length:	4 characters max.
Character Type:	Alpha/Numeric (c-13)
Examples:	P, PP, DEN, LAX, ILAX, MJFK

5.0 NAVIGATION DATA - FIELD DEFINITIONS (cont'd)

<table>
<tr><th>Procedure Use
Facility Type</th><th>SID/STAR</th><th>Approach Transitions</th><th>Path Terminator – CR, VR</th><th>Path Terminator – CD, VD</th><th>Path Terminator - FD</th><th>Missed Approach</th><th>Localizer Final Approach & Transitions of course or heading to intercept localizer</th><th>VORDME/VORTAC Final Approach</th><th>VOR Only Final Approach & Single Record Transitions</th><th>NDB Only Final Approach</th><th>NDB + DME Final Approach</th><th>TACAN Final Approach</th><th>Airports</th></tr>
<tr><td>Co-located VOR DME/VORTAC Theta-Rho</td><td>X
X | X</td><td>X
X | X</td><td>X
X |</td><td>X
|</td><td>X
X | X</td><td>X
X | X</td><td></td><td>X
X | X</td><td>|</td><td>|</td><td>|</td><td>|</td><td>X
|</td></tr>
<tr><td>Non-Co-located VORDME/ VORTAC Theta/Rho</td><td>|</td><td>X
X | X</td><td>|</td><td>|</td><td>|</td><td>X
X | X</td><td>|</td><td>X
X | X</td><td>|</td><td>|</td><td>|</td><td>|</td><td>X
|</td></tr>
<tr><td>Localizer Theta/Rho</td><td>|</td><td>|</td><td>|</td><td>|</td><td>|</td><td>|</td><td>X
|</td><td>|</td><td>|</td><td>|</td><td>|</td><td>|</td><td>|</td></tr>
<tr><td>VOR Theta/Rho</td><td>|</td><td>|</td><td>X
X |</td><td>|</td><td>|</td><td>|</td><td>|</td><td>|</td><td>X
X |</td><td>|</td><td>|</td><td>|</td><td>|</td></tr>
<tr><td>DME Theta/Rho</td><td>|</td><td>|</td><td>|</td><td>X
|</td><td>X
| X</td><td>|</td><td>|</td><td>|</td><td>|</td><td>|</td><td>[3]
| X</td><td>|</td><td>|</td></tr>
<tr><td>TACAN Theta/Rho</td><td>[4]
X | X</td><td>[4]
X | X</td><td>|</td><td>X
|</td><td>X
| X</td><td>[4]
X | X</td><td>|</td><td>|</td><td>|</td><td>|</td><td>|</td><td>X
X | X</td><td>|</td></tr>
<tr><td>NDB Theta/Rho</td><td>|</td><td>|</td><td>|</td><td>|</td><td>|</td><td>|</td><td>|</td><td>|</td><td>|</td><td>[1]
|</td><td>[2]
|</td><td>|</td><td>|</td></tr>
</table>

[1] On FAF Records Only

[2] On FACF and FAF Records

[3] On Runway/MAP Records Only

[4] On TACAN based Procedures Only

Figure 5-7
Procedure Use

5.0 NAVIGATION DATA – FIELD DEFINITIONS (cont'd)

5.24 Theta (THETA)

c-11 Definition/Description: "Theta" is defined as the magnetic bearing to the waypoint identified in the record's "FIX Ident" field from the Navaid in the "Recommended Navaid" field.

Source/Content: Theta values are derived from official government sources when available. They are provided in degrees and tenths of a degree, with the decimal point suppressed. The content is controlled through requirements of the Path Terminator and coding rules contained in Attachment 5 of this specification.

c-14 Used On:	Airport and Heliport SID/STAR/Approach, Enroute Airway Records
Length:	4 characters
Character Type:	Alpha/numeric
Examples:	0000, 0756, 1217 1800

c-11

5.25 Rho (RHO)

Definition/Description: "RHO" is defined as the geodesic distance in nautical miles to the waypoint identified in the record's "Fix Ident" field from the NAVAID in the "Recommended NAVAID" field.

c-12 Source/Content: Rho values derived from official government sources will be used when available. They are entered into the field in nautical miles and tenths of a nautical mile, with the decimal point suppressed. The content is controlled through requirements of the Path Terminator and coding rules contained in Attachment 5 of this specification.

c-14 Used On:	Airport and Heliport SID/STAR/Approach, Enroute Airway Records
Length:	4 characters
Character Type:	Alpha/numeric
Examples:	0000, 0216, 0142, 1074

5.26 Outbound Magnetic Course (OB MAG CRS)

Definition/Description: "Outbound Magnetic Course" is the published outbound magnetic course from the waypoint identified in the record's "Fix Ident" field. In addition, this field is used for Course/Heading/Radials on SID/STAR Approach Records through requirements of the Path Terminator and coding rules contained in Attachment 5 of this specification.

c-11 Source/Content: Values from official government sources will be used when available. The field contains magnetic information expressed in degrees and tenths of a degree, with the decimal point suppressed. For route and procedure segments charted in "degrees true," the last character (tenths position) of the field will contain the character "T". See also Section 5.165 of this document for more information on "degrees true" information.

Used On:	Airport and Heliport SID/STAR/Approach, Enroute Airway and Flight Planning Arrival/ Departure Data Records c-14
Length:	4 characters
Character Type:	Alpha/numeric c-4
Examples:	2760, 0231, 194T

5.27 Route Distance From, Holding Distance/Time (RTE DIST FROM, HOLD DIST/TIME)

Definition/Description: In Enroute Airways, "Route Distance From" is the distance in nautical miles from the waypoint identified in the records "Fix Ident" field to the next waypoint of the route. In SID, STAR and Approach Procedure records, the field may contain segment distances/along track distances/excursion distances/DME distances. The actual content is dependent on the Path and Termination. For more information on the content, refer to Table Three, Leg Data Fields, in Attachment 5 of this document. c-11

Source/Content: The field contains distances, from official government source where available, expressed in nautical miles and tenths of nautical miles with the decimal point suppressed. For Holding Pattern Records and/or Path and Terminations defining holdings patterns, content may be "holding time" expressed in minutes and tenths of minutes preceded by the character "T" with the decimal point suppressed.

Used On:	Airport and Heliport SID/STAR/Approach, Enroute Airway Records c-14
Length:	4 characters
Character Type:	Distance - Numeric; Time - Alpha/numeric c-11
Examples:	1076, 2822, T010, 0208, 0016

5.28 Inbound Magnetic Course (IB MAG CRS)

Definition/Description: "Inbound Magnetic Course" is the published inbound magnetic course to the waypoint in the "Fix Ident" field of the records in which it is employed. c-9

The "HX" group of Path Terminator codes are used to provide racetrack type course reversal flight paths. Government publications for these course reversal include an "inbound magnetic bearing." The SID/STAR/Approach Procedures records do not include a dedicated field for this inbound course. Instead, the information in included in the "Outbound Magnetic Course" field of such records. c-14

Source/Content: Values from official government sources will be used when available. The field contains magnetic bearing in degrees and tenths of a degree, with the decimal point suppressed. For routes charted with true courses, the last character of this field will contain a "T" in place of tenths of a degree. c-9

Used On:	Enroute Airways records
Length:	4 characters
Character Type:	Alpha/numeric
Examples:	2760, 0231, 194T

5.0 NAVIGATION DATA – FIELD DEFINITIONS (cont'd)

5.29 Altitude Description (ALT DESC)

Definition/Description: The "Altitude Descript" field will designate whether a waypoint should be crossed "at," "at or above," "at or below" or "at or above to at or below" specified altitudes.

Source/Content: A code from the following table:

Field Content	Waypoint Crossing Description
+ (plus)	"At or above" altitude specified in first "Altitude" field.
- (minus)	"At or below" altitude specified in first "Altitude" field.
@ (blank)	"At" altitude specified in first "Altitude" field.
B	"At or above to at or below" altitudes specified in the first and second "Altitude" fields.
C	"At or above" altitude specified in second "Altitude" field.
G	Glide Slope altitude (MSL) at waypoint specified in second "Altitude" field (FAF), "at" altitude in first and second "Altitude" field.
H	Glide Slope altitude (MSL) at waypoint specified in second "Altitude" field (FAF), "at or above" altitude in first "Altitude" field, "at" altitude in second "Altitude" field.
I	Second "Altitude" field contains Glide Slope intercept altitude (FACF), "at" altitude in first "Altitude" field.
J	Second "Altitude" field contains Glide Slope intercept altitude (FACF), "at or above" altitude in first "Altitude" field.
V	"At or above" altitude for Stepdown Fix in Final Approach

Note: The "B" entry may only appear in Airport and Heliport SID/STAR/Approach Route, Airport/Enroute/Heliport Communications, VHF Navaid Limitation and Preferred Route Records. The higher value will always appear first in records with two altitude fields, or as the first three digits of the Altitude Limitation field. In Approach Records, use is limited to Approach Transitions with the exception of the last leg of a transition and to Missed Approach with the exception of the first leg of a missed approach.

Note: The "C" entry may only appear in SID records. It is used to indicate that the leg has a conditional altitude termination.

Note: In Final Approach Route Coding, the codes "@ (for blank)," "G," "H," "I," "J," and "V" are applied as indicated in the table above. For more detail refer to procedure coding rules in Attachment 5 of this Specification.

Used On: Airport and Heliport SID/STAR/Approach, Airport, Heliport and Enroute Communications, VHF NAVAID Limitation Continuation, Preferred Routes and Flight Planning Arrival/Departure Data Records.
Length: One character
Character Type: Alpha

5.30 Altitude/Minimum Altitude

Definition/Description: The "Altitude/Minimum Altitude" field indicates the reference altitude associated with (1) Enroute Airways (MEA, MFA or other minimum altitudes as defined by source), (2) holding pattern path of Holding Pattern record, (3) terminal procedure path termination defined by the Path Terminator in the Airport or Heliport SID/STAR/Approach Record and (4) lowest altitude of the "blocked altitudes" for a Preferred Route.

Source/Content: Reference altitudes are determined during route definition. The values are derived from official government source when available. The field may contain altitudes (all numeric) or flight level (alpha/numeric). The all-numeric fields will contain altitudes in feet with a resolution of one foot. The alpha/numeric fields will contain the alpha characters "FL" followed by the altitude expressed in hundreds of feet (three digits) or a code as indicated below.

On Airport and Heliport SID, STAR and Approach Route records, the first "Altitude" field will contain an altitude when "Altitude Description" field contains a plus (+), a minus (-), or a "B," "C," "G," "H," "I," "J," or "V". The first "Altitude" field may contain an altitude when the "Altitude Description" field contains a "blank." The second "Altitude" field will contain an altitude when Altitude Description field contains a "B," "C," "G," "H," "I," "J," or "V".

On Enroute Airway records, the first "Minimum Altitude" field will contain the MEA or MFA if the altitude is the same for both directions of flight and the second "minimum Altitude" will be blank. If the airway segment has directional MEAs/MFAs, the first "Minimum Altitude" field will contain the value for the direction of flight in which the airway is coded and the second "Minimum Altitude" field will contain the value for the opposite direction of flight. The first "Minimum Altitude" field may contain the alpha characters UNKNN when the MEA/MFA is unknown or the alpha characters NESTB when the MEA/MFA has not been established by the appropriate authority.

On Preferred Routes, the "Minimum Altitude" and the "Maximum Altitude" apply to the entire route and are a minimum and maximum block. Altitude 1 and Altitude 2 are fix related, apply only to the fix in the sequence in which they occur and are defined by the Altitude Description field.

Used On: Airport and Heliport SID/STAR/Approach, Holding Pattern, Enroute Airway, Preferred Routes.
Length: 5 characters
Character Type: Alpha/numeric
Examples: 05000, 18000, 00600, FL290, (UNKNN or NESTB on Enroute Airways)

5.0 NAVIGATION DATA – FIELD DEFINITIONS (cont'd)

5.31 File Record Number (FRN)

Definition/Description: The "File Record Number" is a reference number assigned to the record for housekeeping purposes. Records are numbered consecutively, the first record on the tape being assigned the number 00001, the second the number 00002, and so on through the final record on the tape. File record numbers are subject to change at each tape update.

c-1

Source/Content: File record numbers are assigned to records during the assembly of the data file. If the file reaches 99999, the next record number will start over with 00000.

Used On:	All records
Length:	5 characters
Character Type:	Numeric
Examples:	10640, 00420, 31462

5.32 Cycle Date (CYCLE)

Definition/Description: The "Cycle Date" field identifies the calendar period in which the record was added to the file or last revised. A change in any ARINC 424 field, except Dynamic Magnetic Variation, Frequency Protection, Continuation Record Number and File Record Number, requires a cycle date change. The cycle date will not change if there is no change in the data.

c-5

Source/Content: The first two digits of the field contain the last two digits of the year in which the addition or revision was made. The last two digits contain the numeric identity of the 28-day data update cycle during which the change occurred. Each calendar year contains 13 such cycles, however, on rare occasions 14 cycles will be encountered.

Used On:	All records
Length:	4 characters
Character Type:	Numeric

5.33 VOR/NDB Identifier (VOR IDENT/NDB IDENT)

Definition/Description: The "VOR/NDB Identifier" field identifies the VHF/MF/LF facility defined in the record.

c-4

Source/Content: The field contains the official government 1-, 2-, 3- and 4-character facility identification code.

c-10

Used On:	VHF NAVAIDs, NDB NAVAIDs, Airport Localizer Marker records
Length:	4 characters max
Character Type:	Alpha/numeric
Examples:	DEN,6YA,PPI,TIKX

c-4

5.34 VOR/NDB Frequency (VOR/NDB FREQ)

c-1

Definition/Description: The "VOR/NDB Frequency" field specifies the frequency of the NAVAID identified in the "VOR/NDB Identifier" field of the record.

Source/Content: Frequencies are derived from official government sources. VHF NAVAID frequencies contain characters for hundreds, tens, units, tenths and hundredths of megahertz. NDB frequencies contain characters for thousands, hundreds, tens, units and tenths of kilohertz. The decimal point following the unit entry is suppressed in both cases.

Used On:	VHF NAVAID, NDB NAVAID, Airport Localizer Marker records
Length:	5 characters
Character Type:	Numeric
Examples:	VHF 11630, 11795 NDB 03620, 17040

c-4

5.35 NAVAID Class (CLASS)

Definition/Description: The "Class" field identifies the class of the NAVAID facility.

Source/Content: See Table below.

Used On:	NAVAID Records (VHF, NDB and Terminal NDB), Airport Localizer Marker Records
Length:	5 characters max
Character Type:	Alpha

c-10

Facility	28	29	30	31	32
VHF NAVAID					
VOR	V				
TACAN (channels 17-59 & 70-126)		T			
TACAN (channels 1-16 & 60-69)		M			
DME		D			

c-6

Facility	28	29	30	31	32
VHF NAVAID					
ILS/DME or ILS/TACAN		I			
MLS DME/N		N			
MLS DME/P		P			
Terminal			T		
Low Altitude			L		
High Altitude			H		
Unrestricted (See Note 3)			U		
TACAN part of ILS TACAN (See Note 4)			C		
Biased ILS/DME or ILS/TACAN				D	
Automatic Trans Weather Brdcst				A	
Scheduled Weather Brdcst				B	
No Voice on NAVAID Freq (See Note 7)				W	
Non-Colocated VOR and TACAN or DME (See Note 1)					N

c-7

c-10

5.0 NAVIGATION DATA – FIELD DEFINITIONS (cont'd)

c-10

Facility	28	29	30	31	32
L/MF NAVAID					
NDB	H				
SABH	S				
Marine Beacon	M				
Inner Marker		I			
Middle Marker		M			
Outer Marker		O			
Backcourse Marker		C			
2000 watts or more			H		
25 to 50 watts			M		
Less than 25 watts (See Note 6)			L		
Automatic Trans Weather Brdcst				A	
Scheduled Weather Brdcst				B	
No Voice on NAVAID Freq (See Note 7)				W	
BFO Operation Required (See Note 5)					B

Facility	75	76	77	78	79
L/MF NAVAID					
NDB	H				
SABH	S				
Marine Beacon	M				
Inner Marker		I			
Middle Marker		M			
Outer Marker		O			
Backcourse Marker		C			
2000 watts or more			H		
25 to 50 watts			M		
Less than 25 watts (See Note 6)			L		
Automatic Trans Weather Brdcst				A	
Scheduled Weather Brdcst				B	
No Voice on NAVAID Freq (See Note 7)				W	
BFO Operation Required (See Note 5)					B
Locator/Marker colocated (See Note 2)					A
Locator/Marker non-colocated (See Note 2					N

NOTES:

1. The character "N" is entered into column 32 on VHF NAVAID records if either the latitudes and/or longitudes of the VOR and TACAN or DME components of a frequency-paired VHF NAVAID differ by 1/10 arc minutes or more. The column is "blank" for VHF NAVAIDs that are colocated or where the differences in both latitudes and longitudes is less than 1/10 arc minutes. The Character "N" is also entered into column 32 on DME or TACAN records when these are frequency-paired with a Localizer and the latitudes and/or longitudes of the Localizer and TACAN or DME differ by 1/10 arc minutes or more. c-2

2. The character "N" is entered into column 79 on Airport Localizer Marker Records (PM) when the Marker and an associated Locator latitudes and/or longitudes differ by 1/10 arc minutes or more. The character "A" is entered into column 79 on Airport Localizer Marker Records (PM) when for the Marker and an associated Locator, both latitudes and longitudes differ by less than 1/10 arc minutes and at least one is non-zero. Column 79 in this record type is "blank" when the Marker and associated Locator are colocated. c-10

3. The character "U" is entered into column 30 on VHF NAVAID Records when the official government source has not restricted the use of the facility by range or altitude. c-5

4. The character "C" is entered into column 30 on VHF NAVAID Records when that record contains a TACAN Facility that is frequency paired with a Localizer and has the same identifier. It is for civil-use TACAN channels only. When "C" is coded in column 30, the "T" value (Terminal) is understood to apply also.

5. The character "B" is entered into column 32 of an NDB NAVAID Record or column 79 of an Airport Localizer Marker Record when the emission of the NDB or Locator requires BFO (Beat Frequency Oscillator) operation. c-10

6. Column 30 of a NDB NAVAID and column 77 of Airport Localizer Marker Record is "blank" when the output power of the NDB or Locator is between 50 and 1999 watts.

7. Column 31 of the VHF and NDB NAVAID or column 78 of the Airport Localizer Marker Record is "blank" when there is "Voice Transmission Capability" on the NAVAID frequency. This column will always be "blank" on VHF NAVAID Records for TACAN or DME.

5.0 NAVIGATION DATA – FIELD DEFINITIONS (cont'd)

5.36 Latitude (LATITUDE)

Definition/Description: The "Latitude" field contains the latitude of the navigational feature identified in the record.

c-10

Source/Content: Geographic positions whose latitudes must be included in the data base are defined during route design, many of them in official government publications. The field is constructed as follows. The first character position contains the alpha character "N" or "S" indicating whether the latitude is north or south of the equator. "N" is entered for latitudes falling on the equator. The following eight numeric characters define the latitude in degrees, minutes, seconds, tenths of seconds and hundredths of seconds. Degree, minute and second symbols and the decimal point are suppressed.

Note: Some RNAV system users may elect to round off latitude values to resolutions of less than one hundredth of a second prior to the entry of these data into the airborne computer.

The navigation reference points to be defined by latitude and longitude coordinates are listed in Figure 5-8.

c-14

Used On: NAVAID, Waypoint, Airport and Heliport ILS, Airport, Gate, Runway, Airport and Heliport Localizer Marker, Airport and Heliport MLS and GLS, Airport and Heliport MLS Continuation, Airway Marker, Airport and Heliport Communications, Enroute Communications, Heliport, Restrictive Airspace, FIR/UIR, Controlled Airspace, Path Point and GLS Records.
Length: 9 characters
Character Type: Alpha/numeric
Examples: N39513881

5.37 Longitude (LONGITUDE)

Definition/Description: The Longitude field contains the longitude of the geographic position of the navigational feature identified in the record.

c-13

Source/Content: Geographic positions whose longitudes must be included in the data base are defined during route design, many of them in official government publications. The field is constructed as follows: The first character position will contain the alpha character "E" or "W," indicating whether the longitude is east or west of the prime (zero degree) meridian. For longitudes falling on the 0 or 180 degree meridians, "E" is entered. The following nine numeric characters define the longitude in degrees, minutes, seconds, tenths of seconds and hundredths of seconds. Degree, minute and second symbols and the decimal point are suppressed.

Note: Some RNAV system users may elect to round off longitude values to resolutions of less than one hundredth of a second prior to the entry of these data into the airborne computer.

The navigation reference points to be defined by latitude and longitude coordinates are listed in Figure 5-8.

Used On: NAVAID, Waypoint, Airport and Heliport ILS, Airport, Gate, Runway, Airport and Heliport Localizer Marker, Airport and Heliport MLS, GLS Airports and Heliport MLS Continuation, Airway Marker, Airport and Heliport Communications, Enroute Communications, Heliport, Restrictive Airspace, FIR/UIR, Controlled Airspace, Path Point and GLS Records. c-14
Length: 10 characters
Character Type: Alpha/numeric c-1
Examples: W104450794

Record File	Lat/Long Field	Location Defined
Airport	Airport	Aerodrome Reference Point
Airport Comm	Comm (See Note 7)	Transmitter Antenna
Enroute Comm	Comm (See Note 7)	Transmitter Antenna
Enroute Marker	Marker	Marker Antenna
FIR/UIR	FIR/UIR	Boundary Position
FIR/UIR	Arc Origin	Center of Arc
Gate	Gate	Gate
Heliport	Heliport	Helipad
Heliport Comm	Comm	Transmitter Antenna
Localizer	Localizer	Localizer Antenna
Localizer	Glide Slope (See Note 6)	Glide Slope Antenna
Marker/Locator	Marker Beacon	Marker Antenna
Marker/Locator	Locator	Locator Antenna
NDB Navaid	NDB	NDB Antenna
Restr. Airspace	Restr. Airspace	Boundary Position
Restr. Airspace	Arc Origin	Center of Arc
VHF Navaid	VOR (See Note 1)	VOR Antenna
VHF Navaid	DME or TACAN (See Note 2)	DME or TACAN Antenna
Runway	Runway (See Note 5)	Runway Landing Threshold
Waypoint	Waypoint	Waypoint
MLS	Azimuth	Azimuth Antenna
MLS	Elevation	Elevation Antenna
MLS	Back Azimuth (See Note 3)	Back Azimuth Antenna
MLS	Datum (See Note 4)	MLS Reference Datum Point

c-10

Figure 5-8 c-14

Note 1: The VOR latitude and longitude fields are filled when the "NAVAID Class" field contains the letter "V" in column 28 of the record. If column 28 is blank, these fields are blank also. c-5 c-10

Note 2: The DME or TACAN latitude and longitude fields are filled when the "NAVAID Class" field contains the letters "D," "I" "M," "N," "P" or "T" in column 29 of the record. If column 29 is blank, these fields are blank also. c-11

5.0 NAVIGATION DATA – FIELD DEFINITIONS (cont'd)

c-7 Note 3: The MLS Back Azimuth latitude and longitude fields are to be left blank where no such facility exists.

Note 4: MLS Datum is the point on the runway center line closest to the phase center of the approach elevation antenna.

Note 5: The Runway latitude and longitude fields define the Runway Landing Threshold. This threshold can be the beginning of the landing runway pavement. It will be the displaced threshold (inward from the beginning of the landing runway pavement) when such is published by official government documentation.

Note 6: Localizer Glide Slope latitude and longitude may be blank then detail not available through source documentation.

c-10 Note 7: On Communications Records, the Latitude and Longitude always define the transmitter antenna site, regardless if that site is a Remote Communications Outlet or independent transmitter position not associated with a Navaid.

5.38 DME Identifier (DME IDENT)

Definition/Description: The identification of a DME facility, a TACAN facility or the DME (or TACAN) component of a VORDME or VORTAC facility.

Source/Content: The "DME Identifier" field will contain the officially published 2-, 3-, or 4-character DME facility identifier. For VOR/DME and VORTAC facilities, if the identification codes of the VOR and DME components of the NAVAID defined in the record are the same, the field will be blank. If they are not the same, the VOR Identification will be as defined in Section 5.33 and the DME Identifier field will carry the identification of the DME component. The field is blank when the VHF Navaid facility in the reference record has no DME component. The field will always contain the DME Identifier for TACANs, DME Only NAVAIDS and Localizer or MLS DME facilities.

Used On: VHF NAVAID records
Length: 4 characters max
Character Type: Alpha/numeric
Examples: MCR, DEN, IDVR, DN, (Blank)

5.39 Magnetic Variation (MAG VAR, D MAG VAR)

c-12 Definition/Description: The "Magnetic Variation" field specifies the angular difference between True North and Magnetic North at the location defined in the record. "Dynamic Magnetic Variation" is a computer model derived value and takes location and date into consideration. For the "Station Declination" used in some record types, refer to Section 5.66.

Source/Content: Magnetic variations are obtained from official government data sources and other geographical magnetic variation source. A number of different terms are used in government documentation that have specific connotations for the information provided by that government. The most common is "Epoch Year Variation." In theory, this is a value determined by a government agency once every five years and published for general use. Along with Epoch Year Variation, some governments also publish an annual drift value. Data suppliers do not include annual drift derived figures in their databases but rather stay with the Epoch Year value. Another term encountered in source documentation is "Magnetic Variation of Record." This is generally an Epoch Year value. The difference here is that the government authority has established the value as valid for everything associated with a given location. For example, if a Magnetic Variation of Record is established for an airport location, everything referenced to that airport will use the same value. This is of interest as it means that Terminal Procedure design is also based on that value. Obvious differences can occur between a database supplied, semi-static value, and a value derived dynamically, either by the airborne systems or supplier ground systems. Dynamic Magnetic Variation, contained in the VHF Navaid Continuation Record and Enroute/Terminal Waypoint Primary Records, is a computed, earth model derived figure, and is updated dynamically on a schedule established by the data base supplier. Position one of the field contains an alpha character taken from the table below followed by the value of magnetic variation expressed in degrees and tenths of a degree, with the decimal point suppressed. When the first column is coded with the character "T," the value will be all zeros. c-12

c-9

Field Entry	Description
E	Magnetic variation is East of TRUE North
W	Magnetic variation is West of TRUE North
T	The element defined in the current record is oriented to TRUE North in an area in which the local variation is not zero.

Used On: Airport, NDB Navaid, Airport Localizer Marker, MLS, GLS, Airway Marker, Enroute/ Airport/ Heliport Communication, Heliport, Enroute Waypoint, Airport and Heliport Terminal Waypoint and GLS Primary Records and VHF Navaid Continuation Records. c-12 c-10 c-14
Length: 5 characters
Character Type: Alpha/numeric c-10
Examples: E0140, E0000, T0000

5.40 DME Elevation (DME ELEV)

Definition/Description: The "DME Elevation" field defines the elevation of the DME component of the NAVAID described in the record.

Source/Content: DME elevations specified in official government publications are entered into this field in feet with respect to MSL. When the elevation is below MSL, the first column of the field contains a minus (-) sign. c-4

Used On: VHF NAVAID records
Length: 5 characters
Character Type: Alpha/numeric
Examples: 00530, -0140

5.0 NAVIGATION DATA – FIELD DEFINITIONS (cont'd)

5.41 Region Code (REGN CODE)

Definition/Description: The "Region Code" permits the categorization of waypoints and holding patterns as either enroute or terminal area waypoints. In the latter case the terminal area airport is identified in the field.

c-10 Source/Content: The field contains the alpha characters ENRT for enroute waypoints and airport identification code (Airport Ident) for terminal waypoints. In the holding pattern file, the content will match that of the holding fix, e.g. if the holding fix is an enroute waypoint or enroute Navaid, the content with be ENRT; if the holding fix is a terminal waypoint or terminal NDB, the content will be the airport identification.

Used On:	Waypoint and Holding Pattern records
Length:	4 characters
Character Type:	Alpha/numeric
Examples:	ENRT, KLAX, 9V9

5.42 Waypoint Type (TYPE)

c-12 Definition/Description: The "Waypoint Type" field defines both a "type" for a waypoint and a "function" for a waypoint within the waypoint file.

Source Content: The following tables define available "Waypoint Type" codes:

ENROUTE WAYPOINT			
Waypoint Type	Col 27	Col 28	Col 29
Combined Named Intersection and RNAV	C		
Unnamed, Charted Intersection	I	Note 1	Note 2
NDB Navaid as Waypoint	N		
Named Intersection	R		
Uncharted Airway Intersection	U		
RNAV Waypoint	W		
Final Approach Fix		A	
Initial and Final Approach Fix		B	
Final Approach Course Fix		C	
Intermediate Approach Fix		D	
Off-Route Intersection		F	
Initial Approach Fix		I	
Final Approach Course Fix at Initial Approach Fix		K	
Final Approach Course Fix at Intermediate Approach Fix		L	
Missed Approach Fix		M	
Initial Approach Fix and Missed Approach Fix		N	
Oceanic Entry/Exit Waypoint		O	
FIR/UIR or Controlled Airspace Intersection		U	
Latitude/Longitude Intersection, Full Degree of Latitude		V	
Latitude/Longitude Intersection, Half Degree of Latitude		W	

c-10 c-12 c-14

TERMINAL WAYPOINT			
Waypoint Type	Col 27	Col 28	Col 29
ARC Center Fix Waypoint	A	Note 3	Note 3
Combined Named Intersection and RNAV Waypoint	C		
Unnamed, Charted Intersection	I	Note 1	Note 2
Middle Marker as Waypoint	M		
Terminal NDB Navaid as Waypoint	N		
Outer Marker as Waypoint	O		
Named Intersection	R		
RNAV Waypoint	W		
Final Approach Fix		A	
Initial Approach Fix and Final Approach Fix		B	
Final Approach Course Fix		C	
Intermediate Approach Fix		D	
Initial Approach Fix		I	
Final Approach Course Fix at Initial Approach Fix		K	
Final Approach Course Fix at Intermediate Approach Fix		L	
Missed Approach Fix		M	
Initial Approach Fix and Missed Approach Fix		N	
Unnamed Stepdown Fix		P	
Named Stepdown Fix		S	
FIR/UIR or Controlled Airspace Intersection		U	

c-13 c-5 c-14 c-12

ENROUTE AND TERMINAL WAYPOINT			
SID			D
STAR			E
Approach			F
Multiple			Z

c-13

Used On:	Enroute Waypoints, Airport and Heliport Terminal Waypoints.
Length:	3 characters
Character Type:	Alpha

c-14 c-13

Note 1: Column 28 of the Enroute and Terminal Waypoint Types will always be blank when column 27 carries the "N" for NDB or Terminal NDB produced as Waypoints.

Note 2: Possible codes for column 29 are identical for both Enroute and Terminal Waypoints and are those carried in the third portion of the table. Column 29 will always be blank when column 27 carries the "N" for NDB or Terminal NDB produced as Waypoints.

c-14

5.0 NAVIGATION DATA – FIELD DEFINITIONS (cont'd)

c-13 Note 3 When column 27 equals "A" for ARC Center Fix Waypoint, columns 28 and 29 will always be blank.

5.43 Waypoint Name/Description (NAME/DESC)

Definition/Description: The "Waypoint Name/Description" field sets the unabbreviated name of a named waypoint or a c-9 definition of an unnamed waypoint.

Source/Content: The name of a named waypoint is spelled out in full. Definitions for unnamed waypoints are described in Chapter 7 of this specification.

c-14 Used On:	Enroute Waypoints, Airport and Heliport Terminal Waypoints.
Length:	25 characters max
c-9 Character Type:	Alpha/numeric
Examples:	FORT SMITH, LAX04026, LOS235/110, 6100N01234W (OCTA), OM RW26L ALTUR

5.44 Localizer/MLS/GLS Identifier (LOC, MLS, GLS IDENT)

Definition/Description: The "Localizer/MLS/GLS Identifier" field identifies the localizer, MLS facility or GLS Ref Path defined in the record. In the Runway Record, two "Landing Systems" may be defined.

Source/Content: The field contains the identification code of the Localizer or MLS facility or GLS Reference Path derived from official government sources. In the Runway Record, there are two fields labeled c-14 Localizer/MLS/GLS Reference Path identifier and second Localizer/MLS/ GLS Reference Path identifier to encode multiple Localizers, such as an ILS and a LDA associated with a single runway.

Used On:	Runway, Localizer, Localizer Marker, MLS, MLS Continuation and GLS Record.
Length:	4 Characters max
Character Type:	Alpha/Numeric
Examples:	Localizer - IDEN, ISTX, IDU, PP MLS - MDEN, MSTX, MLAX GLS - LFBL, EGLC, KSAN

5.45 Localizer Frequency (FREQ)

Definition/Description: The "Localizer Frequency" field specifies the VHF frequency of the facility identified in the "Localizer Identifier" field.

c-7

Source/Content: The official government-source localizer frequency is entered into the field with a resolution of 50 kHz. The decimal point following the unit MHz entry is suppressed.

c-14 Used On:	Airport and Heliport ILS Localizer records
Length:	5 characters
c-7 Character Type:	Numeric
Examples:	11030, 11195

5.46 Runway Identifier (RUNWAY ID)

Definition/Description: The "Runway Identifier" field identifies the runways described in runway records and runways served by the ILS/MLS described in ILS/MLS records. c-7

Source/Content: Runway identifiers are derived from official government sources and are shown in the following format:

The two letters "RW" are followed by two numerics, 01 thru 36, and may contain a fifth character designation of one of the following: c-5

C = Center (Runway of three parallel runways)
L = Left (Runway of two or three parallel runways)
R = Right (Run way of two or three parallel runways)
T = (Runway and associated flight maneuvers referenced only in degrees true) c-10

Any other designations (suffixes), such as North, South, East, West or STOL will not be included in the ARINC file.

Used On:	Airport and Heliport ILS and MLS, GLS Runway, Airport and Heliport Localizer Marker, Path Point and GLS Records. c-14
Length:	5 characters max
Character Type:	Alpha/numeric c-10
Examples:	RW26L, RW08R, RW26C, RW05, RW17T

5.47 Localizer Bearing (LOC BRG)

Definition/Description: The "Localizer Bearing" field defines the magnetic bearing of the localizer course of the ILS facility/GLS approach described in the record.

Source/Content: Localizer courses, derived from official government sources, are entered into the field in degrees and tenths of a degree, with the decimal point suppressed. c-9 For localizer courses charted with true courses, the last character of this field will contain a "T" in place of tenths of a degree.

Used On:	ILS, GLS records
Length:	4 characters
Character Type:	Alpha/Numeric c-14
Examples:	2570, 0147, 2910, 347T

5.48 Localizer Position (LOC FR RW END) Azimuth/Back Azimuth Position (AZ/BAZ FR RW END)

Definition/Description: The "Localizer/Azimuth Position" field defines the location of the facility antenna relative to one end of the runway.

Source/Content: The field contains the official government source distance, in feet, from the antenna to the runway end. The resolution is one foot. c-7

Used On:	ILS, MLS and MLS Continuation records
Length:	4 characters
Character Type:	Numeric
Examples:	0950, 1000

5.49 Localizer/Azimuth Position Reference (@,+,-)

Definition/Description: The "Localizer/Azimuth Position Reference" field indicates whether the antenna is situated beyond the stop end of the runway, ahead of or beyond the approach end of the runway. The "Back Azimuth Position Reference" field indicates whether the antenna is situated ahead of the approach end of the runway, ahead of or beyond the stop end of the runway.

Source/Content: For Localizer and Azimuth positions the field is blank (@) when the antenna is situated beyond the stop end of the runway, it contains a plus (+) sign when the antenna is situated ahead of the approach end of the runway or a minus (-) sign when it is located off to one side of the runway. For Back Azimuth positions the field is blank (@) when the antenna is situated ahead of the approach end of the runway, it contains a plus (+) sign when the antenna is situated beyond the stop end of the runway or a minus (-) sign when it is located off to one side of the runway.

Used On:	ILS, MLS and MLS Continuation records
Length:	One character
Character Type:	Alpha

c-7

5.50 Glide Slope Position (GS FR RW THRES) Elevation Position (EL FR RW THRES)

Definition/Description: The "Glide Slope/Elevation Position" field defines the location of the antenna with respect to the approach end of the runway.

Source/Content: The field contains four numeric characters indicating the distance in feet (to a resolution of one foot) from a line drawn at right angles to the runway at the antenna position to the threshold of the runway.

Used On:	ILS and MLS records
Length:	4 characters max
Character Type:	Numeric
Examples:	0980, 1417

5.51 Localizer Width (LOC WIDTH)

Definition/Description: The "Localizer Width" field specifies the localizer course width of the ILS facility defined in the record.

c-1

Source/Content: Localizer course widths from official government sources are entered into the field in degrees, tenths of a degree and hundredths of a degree with the decimal point suppressed.

Used On:	ILS records
Length:	4 characters
Character Type:	Numeric
Examples:	0500,0400,0350

c-7

5.52 Glide Slope Angle (GS ANGLE) Minimum Elevation Angle (MIN ELEV ANGLE)

Definition/Description: The "Glide Slope Angle" field defines the glide slope angle of an ILS facility/GLS approach. The "Minimum Elevation Angle" field defines the lowest elevation angle authorized for the MLS procedure.

Source/Content: Glide Slope and Elevation angles from official government sources are entered into the fields in degrees, tenths of a degree and hundredths of a degree with the decimal point suppressed. c-7

Used On:	ILS, GLS and MLS records c-14
Length:	3 Characters
Character Type:	Numeric c-7
Example:	275, 300

5.53 Transition Altitude/Level (TRANS ALTITUDE/LEVEL)

Definition/Description: The "Transition Altitude" field defines the altitude in the vicinity of an airport or heliport at or below which the vertical position of an aircraft is controlled by reference to altitudes (MSL). The "Transition Level" field defines the lowest flight level available for use above the transition altitude. Aircraft descending through the transition layer will use altimeters set to local station pressure, while departing aircraft climbing through the layer will be using standard altimeter setting (QNE) of 29.92 inches of mercury, 1013.2 millibars or 1013.2 hectopascals. c-8

Source/Content: Transition Altitudes/Levels are derived from official government sources. For STAR and Approach records, the field defines the level, expressed in feet, at which the altimeter barometric setting is changed from standard to local values for the airport or heliport identified in the record. For SID records, the field will contain the Transition Altitude expressed in feet. The first leg of each Airport and Heliport SID/ STAR/Approach procedure shall contain the appropriate transition altitude with a resolution of one foot. If the transition altitude is unknown or "by ATC," the field will be blank in procedure records. For Airport and Heliport records, the Transition Altitude and Transition Level will be entered into the appropriate fields, in feet with a resolution of one foot. If the Transition Altitude or Level is unknown, "by ATC" or has different values for varying procedures at the airport or heliport, the field will be blank. c-7

Used On:	Airport and Heliport SID/STAR/Approach, Airport and Heliport Records c-14
Length:	5 characters
Character Type:	Numeric c-8
Examples:	05000, 23000, 18000

5.54 Longest Runway (LONGEST RWY)

Definition/Description: The "Longest Runway" field permits airport to be classified on the basis of the longest operational hard-surface runway. c-5

Source/Content: The longest runway will be derived from official government sources and entered in the field in hundreds of feet. This value will represent the longest hard-surfaced operational runway available without restriction at the airport. The value reflects overall pavement length declared suitable and available for the ground operations of aircraft. Where no hard-surfaced runway is available or those available do not meet criteria, the value will represent the longest operational runway at the airport. c-14

5.0 NAVIGATION DATA – FIELD DEFINITIONS (cont'd)

Used On:	Airport Records
Length:	3 characters
c-5 Character Type:	Numeric
Examples:	040, 055, 098, 111

5.55 Airport/Heliport Elevation (ELEV)

Definition/Description: The elevation of the airport/Heliport specified in the record is defined in the "Airport Elevation" and "Heliport Elevation" field.

Source/Content: Airport/Heliport elevations are to be derived from official government sources and entered into the field in feet to a resolution of one foot. For elevations above MSL, the field contains the numeric characters of the elevation only. For below MSL elevations the first character of the field is a minus (-) sign. In most cases, airport elevation is defined as the highest elevation of any landing surface on the airport.

Used On:	Airport and Heliport records
Length:	5 characters
Character Type:	Alpha/numeric
Examples:	02171,-0142,05230

c-8

5.56 Gate Identifier (GATE IDENT)

Definition/Description: The airport gate defined in the record is identified in the "Gate Identifier" field.

Source/Content: Coded gate identity information is derived from official government sources and navigation system users.

Used On:	Gate records
Length:	5 characters max
Character Type	Alpha/numeric
Examples:	"C134B,23,30A,B12A

5.57 Runway Length (RUNWAY LENGTH)

Definition/Description: The "Runway Length" field defines the total length of the runway surface declared suitable and available for ground operations of aircraft for the runway identified in the records' Runway Identifier field.

Source/Content: Runway lengths are derived from official government sources and are entered in feet with a resolution of one foot. The value represents the overall length of the runway, with no regard for displaced thresholds. It does not include stopways, overruns or clearways. Available landing lengths and take-off runs are
c-14 not necessarily identical to this runway length. Analysis of the content of Section 5.69, Displaced Threshold and 5.79, Stopway is required to determine these operational lengths. As the latitude/longitude information in the runway record reflects the Landing Threshold Point of the runway identified in the record, which may or may not be displaced, there is no direct correlation between the Runway Length and a value calculated based on these latitude/longitude values. For additional information on runway length analysis and operational length calculations, see Figure 5-9.

Used On:	Runway Records
Length:	5 characters
Character Type:	Numeric c-8
Examples:	05000, 07000, 11480

5.58 Runway Magnetic Bearing (RWY BRG)

Definition/Description: The magnetic bearing of the runway identified in the "runway identifier" field of the record is specified in the "Runway Magnetic Bearing" field. c-9

Source/Content: Runway magnetic bearings derived from official government sources are entered into the field in degrees and tenths of a degree, with the decimal point suppressed. For runway bearings charted with true bearings, the last character of this field will contain a "T" in place of tenths of a degree.

Used On:	Runway records
Length:	4 characters
Character Type:	Alpha/numeric c-14
Examples:	1800,2302,0605, 347T

5.59 Runway Description (RUNWAY DESCRIPTION)

Definition/Description: If required, additional information concerning a runway can be included in a record in the "Runway Description" field.

Source/Content: Appropriate contents for the field will be determined when the record is assembled. c-9

Used On:	Runway records
Length:	22 characters max
Character Type:	Alpha/numeric
Examples:	GROOVED, SINGLE ENG. ONLY

5.60 Notes (Primary Records) (NOTES)

Definition/Description: The "Notes" field provides space in the record for information supplementary to that contained in the encoded part of the record.

Source/Content: Appropriate contents for the field will be determined when the record is assembled.

Used On:	Gate and Holding Pattern records
Length:	22 characters max
Character Type:	Alpha/numeric
Examples:	HOLDING JIMEE MIAMI

5.61 Notes (Continuation Records) (NOTES) c-1

Definition/Description: The "Notes" field (continuation record) is provided to accommodate any information that cannot be entered in the primary record.

Source/Content: Appropriate contents for the field will be determined at the time the primary record is assembled.

Used On:	All except Company route records
Length:	70 characters max
Character Type:	Alpha/numeric
Examples:	EASTBOUND PREFERRED 090/0Z/230/0Z

5.0 NAVIGATION DATA – FIELD DEFINITIONS (cont'd)

5.62 Inbound Holding Course (IB HOLD CRS)

Definition/Description: The "Inbound Holding Course" field defines the inbound course to the holding waypoint.

c-9 Source/Content: Inbound holding courses derived from official government sources are entered into the field in degrees and tenths of a degree, with the decimal point suppressed. For holding courses charted with true bearings, the last character of this field contains a "T" in place of tenths of a degree.

Used On:	Holding Pattern records
Length:	4 characters
Character Type:	Alpha/numeric (c-14)
Examples:	0456,1800,3034, 347T

5.63 Turn (TURN)

Definition/Description: The "Turn" field specifies the direction in which holding pattern turns are to be made.

c-3 Source/Content: The "Turn" field will always contain either L or R.

Used On:	Holding Pattern records
Length:	One character
Character Type:	Alpha

5.64 Leg Length (LEG LENGTH)

Definition/Description: The "Leg Length" field specifies the distance between the point at which the aircraft rolls out on the inbound leg of the holding pattern and the fix at which the holding pattern is defined (see Figure 5-10).

Source/Content: Leg length derived from official government sources is entered into the field in nautical miles and tenths of a nautical mile, with the decimal point suppressed.

c-2

Used On:	Holding Pattern records
Length:	3 characters
Character Type:	Numeric
Examples:	108,055

5.65 Leg Time (LEG TIME)

Definition/Description: The "Leg Time" field specifies the length of the inbound leg of a holding pattern in units of time (see Figure 5-10).

Source/Content: Leg time, derived from official government sources, is entered into this field in minutes and tenths of a minute, with the decimal point suppressed.

Used On:	Holding Pattern records
Length:	2 characters
Character Type:	Numeric
Examples:	10,15,20

5.66 Station Declination (STN DEC)

Definition/Description: For VHF NAVAIDS, the "Station Declination" field contains the angular difference between true north and the zero degree radial of the NAVAID at the time the NAVAID was last site checked. For ILS localizers, the field contains the angular difference between true north and magnetic north at the localizer antenna site at the time the magnetic bearing of the localizer course was established. c-2

Source/Content: Station declinations are derived from official government sources. The field contains one of the alpha characters shown in the following table followed by the value of the declination in degrees and tenths of a degree, with the decimal point suppressed. When the first column of the Station Declination field is coded T or G, the remainder of the field should be coded all zeros. c-3

Column 1 Character	Declination Description
E	Declination is East of True North
W	Declination is West of True North
T	Station is oriented to True North in an area in which the local variation is not zero.
G	Station is oriented to Grid North

c-2

Used On:	VHF NAVAID and ILS records (c-5)
Length:	5 characters
Character Type:	Alpha/Numeric
Examples:	E0072, E0000, T0000, G0000 (c-8)

COMMENTARY

> The appearance of the character "G" in column 1 of this field will alert users that although a NAVAID declination may not be zero, the fact that the grid reference is unknown prevents a value from being defined. c-3

5.67 Threshold Crossing Height (TCH)

Definition/Description: The "Threshold Crossing Height" specifies the height above the landing threshold on a normal glide path.

Source/Content: The Threshold Crossing Height will be derived from official government sources when available. For runway records the Glide Slope Height at landing threshold will be used for runways with ILS approaches. If an ILS is not available, it will be the RNAV waypoint height, if neither of these values is available it will be 50 feet. c-1

Used On:	Airport and Heliport ILS and MLS, Runway, and Path Point Records (c-14)
Length:	2 characters
Character Type:	Numeric (c-1)
Example:	50

5.68 Landing Threshold Elevation (LANDING THRES ELEV)

Definition/Description: The elevation of the landing threshold of the runway described in a runway record is defined in the "Landing Threshold Elevation" field.

c-1 Source/Content: Runway landing threshold elevations derived from official government sources are entered into this field in feet, to a resolution of 1 foot. For elevations above MSL, the field contains the numeric characters of the elevation only. For below MSL elevations, the first character of the field is a minus (-) sign.

Used On:	Runway records
Length:	5 characters
Character Type:	Alpha/numeric
Examples:	01250, -0150

Not for navigational or other operational use. For example only. Please consult current navigation charts.

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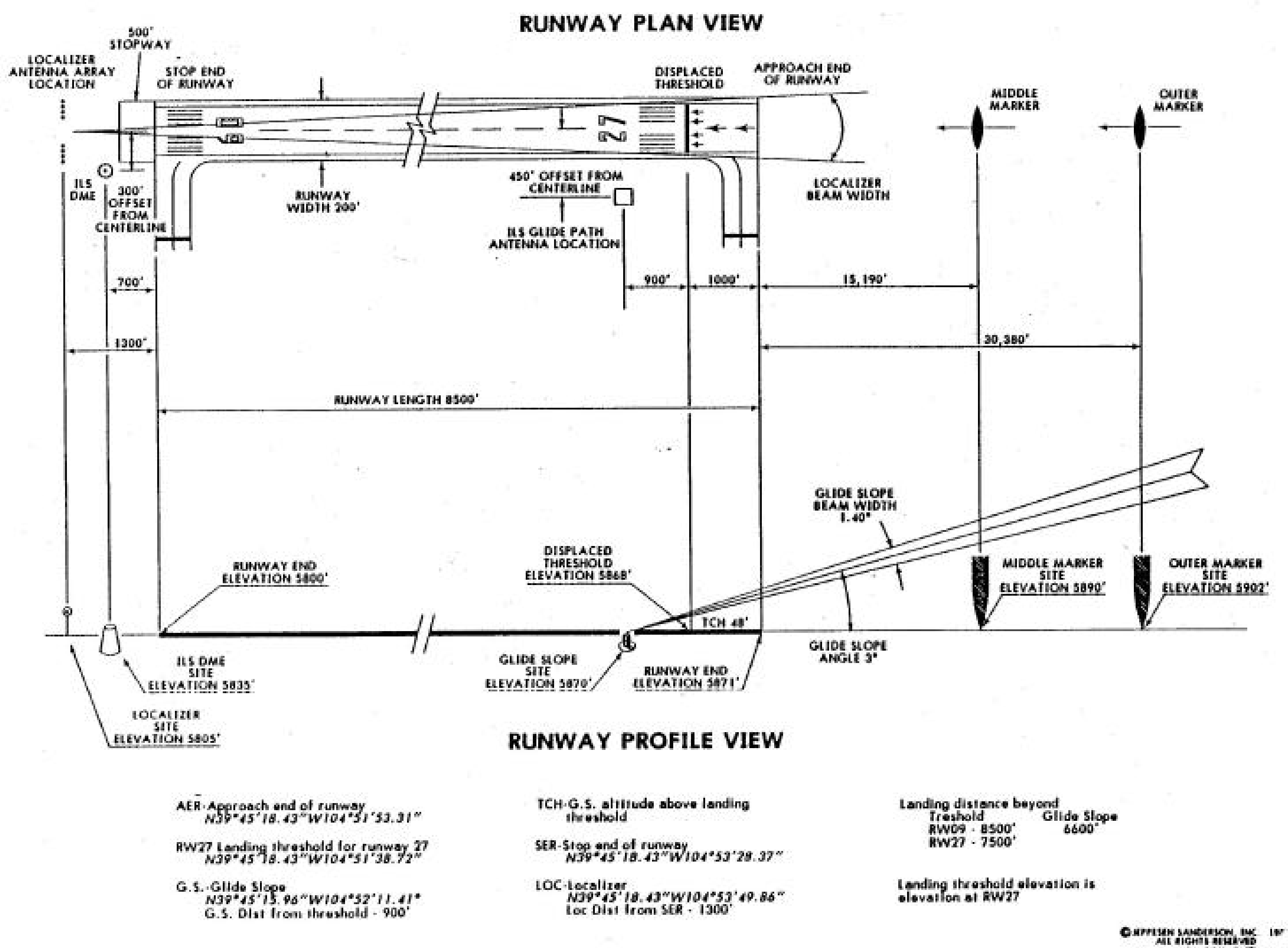
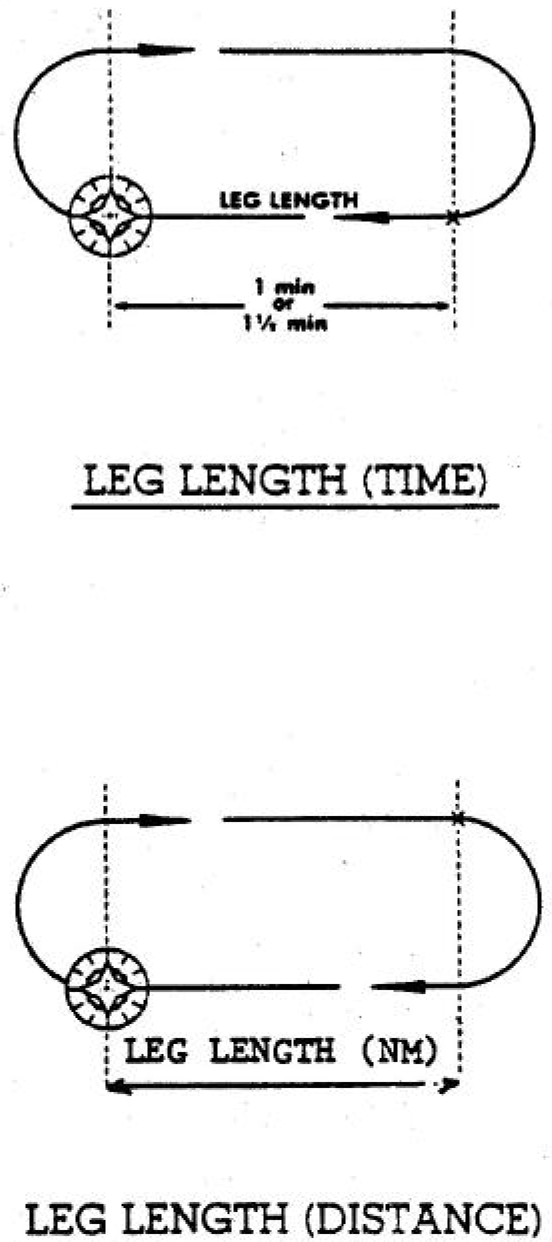


Figure 5-9



c-2

Figure 5-10

HOLDING PATTERN LEG LENGTH

*Leg time diagram added by Supplement 1

5.69 Threshold Displacement Distance (DSPLCD THR)

Definition/Description: The distance from the extremity of a runway to a threshold not located at that extremity of that runway.

c-1 Source/Content: Threshold displacement distances derived from official government sources are entered into this field in feet.

Used On: Runway records
Length: 4 characters
Character Type: Numeric
Examples: 0485, 1260

5.70 Vertical Angle (VERT ANGLE)

c-15 Definition/Description: The "Vertical Angle" field defines the vertical navigation path prescribed for the procedure. The vertical angle should cause the aircraft to fly at the last coded altitude and descend on the angle, projected back from the fix and altitude at which the angle is coded. Vertical Angle information is provided only for descending vertical navigation. The angle is preceded by a "–" (minus sign) to indicate the descending flight.

Source/Content: Values from official government sources will be used when available. The angles are expressed in degrees, tenths, and hundredths of a degree, with the decimal point suppressed. Vertical Angle may also be coded as a calculated value as indicated in Attachment 5.

c-14 Used On: Airport and Heliport SID/STAR/Approach Records
c-8 Length: 4 characters
Character Type: Alpha/Numeric
c-15 Examples: -300, -375

5.71 Name Field

Definition/Description: This field will be used to further define the record by name.

Source/Content: Facility name will be derived from official government sources. A parenthetical name following the official name may be used to identify the location of the facility.

c-8 Used On: Navaid, Airport, Heliport and Enroute Marker records
Length: 30 characters
Character Type: Alpha

5.72 Speed Limit (SPEED LIMIT)

c-14 Definition/Description: The speed limit will be a maximum speed, expressed in K.I.A.S.

c-10 Source/Content: The speed limit will be derived from official government source documentation and shown in
c-14 Knots on an applicable Airport or Heliport SID/STAR/Approach Record. On SIDs, the speed limit will apply to all legs up to and including the terminator of the leg on which the limit is encoded from the beginning of the procedure. If a second speed limit is
c-10 coded on a subsequent leg, the limit will be applied from that leg backwards to the previous terminator which contained a speed limit. On STARs, the speed limit will be applied forward to the end of the arrival, (i.e. throughout the procedure until the end of the Flight Plan) unless a second speed limit is encoded. The intent in both SIDs and STARs is to exclude speed changes inconsistent with the procedure type. When used on Airport and Heliport records, the speed limit applies to all flight segments departing or arriving that Airport's or Heliport's terminal area, at and below the specified Speed Limit Altitude (see Section 5.73). c-14

Used On: Airport and Heliport SID/STAR/Approach, Airport and Heliport, Flight Planning Arr/Dep Data Records
Length: 3 characters
Character Type: Numeric
Examples: 250

5.73 Speed Limit Altitude

Definition/Description: "Speed Limit Altitude" is the altitude below which speed limits may be imposed.

Source/Content: The "Speed Limit Altitude" will be derived from official government sources in feet MSL or FL's. c-8

Used On: Airport and Heliport records
Length: 5 characters
Character Type: Alpha/numeric
Examples: 10000, F125

5.74 Component Elevation (GS ELEV, EL ELEV, AZ ELEV, BAZ ELEV)

Definition/Description: The "Component Elevation" field defines the elevation of a given component in the Localizer, GLS and MLS records. The "Glide Slope Elevation (GS ELEV)" defines the elevation of the Glide Slope component in the Localizer Records. The "EL Elevation (EL ELEV)" defines the elevation of the Elevation component of the MLS Record, the "Azimuth Elevation (AZ ELEV)" defines the elevation of the Azimuth component of the MLS Record and the "Back Azimuth Elevation (BAZ ELEV)" defines the elevation of the Back Azimuth component of the MLS Record. The "GLS station elevation (GLS ELEV)" defines the elevation of the GLS ground station in the GLS record. c-12

Source/Content: Elevations specified in official government publications are entered in this field with respect to MSL. When the elevation is below MSL, the first column of the field contains a minus (-) sign.

Used On: Localizer, MLS and GLS Records and MLS Continuation Records
Length: 5 characters
Character Type: Alpha/numeric c-14
Examples: 00235, 01265, -0011

5.75 From/To - Airport/Fix

Definition/Description: When used on Company Routes, the "From Airport/Fix" is the waypoint from which the company route originates. The "To Airport/Fix" is the waypoint at which the company route terminates. When used on Alternate Records, it is the Departure, Destination or Enroute Airport/Fix for which the alternate information is being provided. c-14

Source/Content: The customer is responsible for defining points at which company routes originate and terminate and for defining which departure, destination or enroute points are to have alternate information.

Used On: Company Route and Alternate Records
Length: 5 characters max.
Character Type: Alpha/numeric

5.76 Company Route Ident

c-1 Definition/Description: The "Company Route Ident" field identifies each unique route between origination and destination.

Source/Content: This field is determined by the customer.

Used On: Company Route records
Length: 10 characters
Character Type: Alpha/Numeric

c-1 5.77 VIA Code

Definition/Description: The "VIA Code" field is used to define the type of route used in the SID/STAR/Approach/Airways field (Section 5.78) on Company Route records and defines the type of route used in the AWY Identifier on Preferred Route records. On the Preferred Route records, some codes define the use, or restriction to use, of a fix or routing. c-13

Source/Content: The code to be entered shall be selected from the table below:

Company Route Record (R)

VIA Field	Description
ALT	Alternate Airport
APP	Approach Route
AWY	Designated Airway
DIR	Direct to Fix
INT	Initial Fix
PRE	Preferred Route
SID	Standard Instrument Departure
SDE	Standard Instrument Departure - Enroute Transition
SDY	Standard Instrument Departure - Runway Transition
STR	Standard Terminal Arrival and Profile Descent
STE	Standard Terminal Arrival and Profile Descent - Enroute Transition
STY	Standard Terminal Arrival and Profile Descent - Runway Transition

c-9

Preferred Route Record (ET)

VIA Field	Description
AWY	Designated Airway
DIR	Direct to Fix
INT	Initial Fix
RVF	Route via Fix
RNF	Route via Fix not permitted
SID	Standard Instrument Departure
STR	Standard Terminal Arrival and Profile Descent

c-13

Used On: Company Route and Preferred Route records
Length: 3 characters
Character Type: Alpha/numeric c-13

NOTE: Figure 5-14 illustrates how various fields are to be completed in the Company Route Record based on the various "VIA Codes" defined in this paragraph. c-14

5.78 SID/STAR/App/AWY (S/S/A/AWY) SID/STAR/Awy (S/S/AWY)

Definition/Description: This field is used to identify the particular route to be flown as referenced by the "VIA" field (5.77).

Source/Content: For Company Route records this field can contain the SID/STAR, Approach, Enroute Airway, or Preferred Route Identifier (see paragraphs, 5.8, 5.9, and 5.10). For Preferred Route records this field can contain the SID/STAR or Enroute Airway Route Identifier (see paragraph 5.8). This field will be blank for certain records depending on the "VIA" field content (5.77). c-9

Used On: Company Route and Preferred Route Records
Length: 6 characters
Character Type: Alpha/numeric
Examples: VIA S/S/A/AWY
SIDCUIT8
STRLOCKE9
APPI19L
AWYJ501

5.79 Stopway c-1

Definition/Description: "Stopway" means the length of an area beyond the take-off runway, no less wide than the runway and centered upon the extended centerline of the runway, and designated for use in decelerating the airplane during an aborted takeoff. c-5

Source/Content: The Stopway will be derived from official government sources and shown in feet. (See Figure 5-3).

Used On: Runway records
Length: 4 characters
Character Type: Numeric
Examples: 0900, 1000

5.80 ILS Category (CAT)

Definition/Description: The Localizer/MLS/GLS Performance Categories have established operating minimums and are listed as Category I, II, and III. The level of Performance Category does not imply that permission exists to use the facility for landing guidance to that level and does not limit minima using designated classification. This field is also used to define the classification, non-ILS/MLS/GLS, and localizer installation such as IGS, LDA, or SDF. As used in the runway record, there are two fields, one labeled Localizer/MLS/GLS Category/Classification and the other labeled Second Localizer/MLS/GLS Category/Classification. c-14

5.80 ILS Category (CAT) (cont'd)

c-14 Source/Content: The Localizer/MLS/GLS Category/Classification will be derived from official government sources and will be indicated by a value from the table below.

c-13 c-14 c-13

Definition	Category/ Classification
ILS Localizer Only, No Glideslope	0
ILS Localizer/MLS/GLS Category I	1
ILS Localizer/MLS/GLS Category II	2
ILS Localizer/MLS/GLS Category III	3
IGS Facility	I
LDA Facility with Glideslope	L
LDA Facility, no Glideslope	A
SDF Facility with Glideslope	S
SDF Facility, no Glideslope	F

c-14 Used On: Runway, Localizer, MLS and MLS Continuation Records, GLS Record.
c-13 Length: 1 character
Character Type: Alpha/Numeric

5.81 ATC Indicator (ATC)

Definition/Description: The "ATC Indicator" field will be used to indicate that the altitudes shown in the altitude fields can be modified by ATC or the altitude will be assigned by ATC.

c-5 Source/Content: This field will contain the alpha character "A" when the official government source states that the altitude can be modified or assigned by ATC. This field will contain the alpha character "S" when the official government source states that the altitude will be assigned by ATC or if no altitude is supplied.

c-14 Used On: Airport and Heliport SID/STAR/ Approach Records
c-5 Length: 1 character
Character Type: Alpha

5.82 Waypoint Usage

Definition/Description: The waypoint usage field is employed to indicate the airway structure in which the waypoint is utilized.

Source/Content:

c-2 c-5

Usage	Record Column Content	
	30	31
HI and LO Altitude Airway		B
HI Altitude Airway		H
LO Altitude Airway		L
HI Altitude RNAV Airway	R	
Terminal Use only	Blank	Blank

c-2 Used On: Enroute (EA) waypoint records
Length: 2 characters
Character Type: Alpha

5.83 To FIX

c-10 Definition/Description: The Company Route and Preferred Route "To Fix" field is used to terminate the route referenced in the SID/STAR/APCH/AWY field (5.78), or terminate a "Direct" segment or start an "Initial" segement when no SID/STAR/APCH/AWY is referenced.

Source/Content: For Company Route records the field will contain Enroute Waypoint, Terminal Waypoint, VHF NAVAID, NDB NAVAID, Terminal NDB NAVAID, Airport or Runway Identifier. The customer will define where a particular route segment is to terminate. For Preferred Route records, the field will contain Enroute Waypoint, Terminal Waypoint, VHF NAVAID, NDB NAVAID or Terminal NDB NAVID, Airport Identifier.

Used On: Company Route and Preferred Route Records
Length: Company Route - 6 characters max. Preferred Route - 5 characters max.
Character Type: Alpha/numeric
Examples: SHARP, BHM, DEN43, KDEN, RW35R

5.84 RUNWAY TRANS

Definition/Description: This field is used to identify the desired runway transition of the applicable SID or STAR. It is used to link directly to the SID/STAR procedure records depending on the Company Route record "VIA" field (5.77) and whether or not the SID/STAR has explicit runway transitions.

Source/Content: If the applicable SID/STAR has explicit runway transitions then this field uniquely identifies the desired runway transition. If no runway transition is desired, the field is blank. If the applicable SID/STAR does not have explicit runway transitions this field is always non-blank and exactly matches the "TRANS IDENT" field of the SID/STAR procedure records. c-3

VIA field contains "SDY" or "STY":

In this situation the field contents are defined exactly as stated above (VIA field = "SID" or "STR") except that the field is always non-blank. This field is blank for all other contents of the VIA field.

VIA field contains "SID" or "STR":

Used On: Company Route Records
Length: 5 characters
Character Type: Alpha/Numeric
Examples: RW08L, ALL, Blank

5.85 ENRT TRANS

Definition/Description: This field is used to identify the desired enroute transition of the applicable SID or STAR. It can also be used to identify the desired approach transition of an approach.

Source/Content:

VIA field contains "SID" or STR":

5.85 ENRT TRANS (cont'd)

c-3 This field uniquely identifies the desired SID/STAR enroute transition. If no enroute transition is desired, the field is blank.

VIA field contains "SDE" or "STE":

In this situation the field contents are defined exactly as stated above (VIA field - "SID" or "STR") except that the field is always non-blank.

VIA field contain "APP":

This field uniquely identifies the desired approach transition. If no approach transition is desired, the field is blank.

The field is blank for all other contents of the VIA field.

Used On:	Company Route Records
Length:	5 characters
Character Type:	Alpha/Numeric
Examples:	ETS, KEENE, DEN

5.86 Cruise Altitude

Definition/Description: This field will be used to establish an Enroute Cruise Altitude. It will be entered on Company Route records as specified by the customer.

Source/Content: The customer will supply the Cruise Attitude in feet or flight level.

Used On:	Company Route Records
Length:	5 characters
Character Type:	Alpha/Numeric
Examples:	10000, 15000, FL090, FL240

5.87 Terminal/Alternate Airport (TERM/ALT ARPT)

Definition/Description: T his field has two uses depending on the "VIA" field and File Code for "To Fix." For "VIA" field content of "ALT" this field will contain the Alternate Airport Ident for this Company Route. If the file code for "To Fix" contains "P," this field will contain the Airport Ident for REGN CODE (Section 5.41) of Terminal Waypoints (PC records) and Runway (PG records).

Source/Content: See Section 5.6, Airport ICAO Identifier.

Used On:	Route Records
Length:	4 characters
Character Type:	Alpha/Numeric
Examples:	KDEN, EDDF

5.88 Alternate Distance (ALT DIST)

Definition/Description: This field is used to supply the
c-5 distance in nautical miles from the "To Airport/Fix" to the "ALT ARPT".

Source/Content: Values for this field will be supplied by the customer and must be equal to or greater than the great circle distance from the destination airport/fix to the alternate airport. c-5

Used On:	Company Route Records
Length:	4 characters
Character Type:	Numeric
Examples:	052, 0011, 0123

5.89 Cost Index

Definition/Description: The Cost Index field is used to define the relative value of fuel-related costs and time-related costs for a particular route.

Source/Content: Source will be by customer airline.

Used On:	Company Route Records c-3
Length:	3 characters
Character Type:	Numeric
Examples:	001, 011, 999

5.90 ILS/DME Bias c-4

Definition/Description: This field is used to specify the DME offset.

Source/Content: The field contains a 2-digit bias term in nautical miles and tenths of a nautical mile with the decimal point suppressed. Field is blank for unbiased DME's.

Used On:	VHF NAVAID Records containing ILS/DME or MLS/DME Facilities c-10
Length:	2 characters
Character Type:	Numeric
Examples:	13, 91

5.91 Continuation Record Application Type (APPL)

Definition/Description: This field indicates specific application of this continuation record.

Source/Content:

Field Content	Application
P	Flight Planning
S	Simulation

Used On:	Continuation records
Length:	One character c-4
Character Type:	Alpha

5.92 Facility Elevation (FAC ELEV)

Definition/Description: This "Elevation" field defines the elevation of the VOR, NDB, ILS Marker, Airways Marker and Airport Communications stations.

Source/Content: Facility elevations specified in official government publications are entered into this field in feet with respect to MSL. When the elevation is below MSL, the first column of the field contains a minus (-) sign.

c-4

5.92 Facility Elevation (FAC ELEV) (cont'd)

c-8

Used On: ILS Marker, Airways Marker, Enroute/Airport Communications primary records. VHF Navaids and NDB Navaids continuation records.
Length: 5 characters
Character Type: Alpha/Numeric
Examples: 00530, -0014

c-4

5.93 Facility Characteristics (FAC CHAR)

Definition/Description: The "Facility Characteristics" field identifies the characteristics of the NAVAID facility.

Source/Content:

Facility	28	29	30	31	32
VHF NAVAID, ILS & MLS					
Synchronous Asynchronous Unknown	S A U				
VHF NAVAID, NDB NAVAID and Locator					
Voice Ident No Voice Ident Undefined		Y N U			
NDB NAVAID					
Type of emission 400H 1020H Repetition Rate			Note 1	 4 1	 Note 2
ILS DME Location					
Colocated with Localizer Note 3 Colocated with Glide Slope Not co-located with Localizer or Glide Slope					L G Blank
ILS Back Course					
Usable Unusable Restricted Undefined				Y N R U	
MLS, DME or DME/P Location					
Colocated with Azimuth Colocated with Elevation Not Colocated with Azimuth or Elevation					A E N
MLS Approach Azimuth Scan Rate				Note 4	

c-7

Used On: ILS Marker Primary records, VHF Navaid, NDB Navaid and ILS/MLS continuation records
Length: 5 characters
Character Type: Alpha/Numeric c-7

Note 1: 0=A0, 1=A1, 2=A2 c-4

Note 2: Enter number of occurrences per minute if known. Leave blank if not known.

Note 3: Colocated means that the latitudes and longitudes of the two facilities differ by no more than 1 arc second.

c-7

Note 4: Where a high-rate approach azimuth guidance is available, enter "H," otherwise leave blank.

COMMENTARY

The NDB emission designators set forth in Note 1 above are being replaced with the new designators shown in the equivalency table below as the result of action taken at the 1979 ITU World Administrative Radio Conference. c-4

Present Designator	New Designator	Description
A0	NON	Unmodulated Carrier
A1	A1A	Carrier keyed, bandwidth less than 0.1 kHz
A1	A1B	Carrier keyed, bandwidth greater than 0.1 kHz
A2	A2A	Tone keyed modulation

5.94 True Bearing (TRUE BRG)

Definition/Description: The "Magnetic Bearing" for ILS localizer, MLS Azimuth, MLS Back Azimuth and Runway records is given in the primary record. This field allows the true bearing to be entered independently of the magnetic variation. c-7

Source/Content: True Bearings are entered into the field in degrees, tenths of a degree and hundredths of a degree, with the decimal point suppressed. See Section 5.95 for source description. c-4

Used On: ILS Continuation, MLS Continuation and Runway Continuation records c-8
Length: 5 characters
Character Type: Numeric
Examples: 19000, 23021, 06050

5.95 Government Source (SOURCE)

Definition/Description: The content of the source field indicates whether the "True Bearing" is derived from official government sources or from other sources. c-4

5.0 NAVIGATION DATA - FIELD DEFINITIONS (cont'd)

5.95 Government Source (SOURCE) (cont'd)

Source/Content: The field contains "Y" when the "True Bearing" is derived from official government sources and "N" when it is derived from other sources.

Used On: ILS, MLS, MLS continuation and runway continuation records
Length: 1 character
Character Type: Alpha

5.96 Glide Slope Beam Width (GS BEAM WIDTH)

Definition/Description: The "Glide Slope Beam Width" field specifies the glide path beam width of the Glide
c-7 Slope defined in the record.

Source/Content: Glide Slope beam widths from official government sources are entered into this field in degrees, tenths of a degree and hundredths of a degree with the decimal point suppressed.

Used On: ILS continuation records
Length: 3 characters
Character Type: Numeric
Examples: 140, 180, 200

5.97 Touchdown Zone Elevation (TDZE)

Definition/Description: The "Touchdown Zone Elevation" is the highest elevation in the first 3,000 feet of the landing surface beginning at the threshold.

Source/Content: Touchdown zone elevations from official government sources will be used when available. If official source is not available, the runway threshold elevation will be entered. If the runway threshold
c-4 elevation is not available, the Airport reference point elevation will be entered. (See TDZE Location, Section 5.98) The elevation will be entered in feet, to a resolution of 1 foot, with respect to MSL. For below MSL elevations, the first character of the field is a minus (-) sign.

Used On: Runway continuation records
Length: 5 characters
Character Type: Alpha/Numeric
Examples: 02171, 05230, -0142

5.98 TDZE Location (LOCATION)

Definition/Description: The content of the "TDZE Location" field indicates whether the TDZ elevation was obtained from official government sources or from other sources.

Source/Content: The field will contain a "T" for official source or a "L" if the landing threshold elevation is used, or an "A" if the airport elevation is used.

Used On: Runway continuation records
Length: 1 character
Character Type: Alpha

5.99 Marker Type (MKR TYPE)

Definition/Description: The "Marker Type" field defines the type of c-4
marker.

Source/Content: The field contains the following information.

Type of Facility	Record Column Content		
	18	19	20
Inner Marker		I	M
Middle Marker		M	M
Outer Marker		O	M
Back Marker		B	M
Locator at Marker	L		

Used On: Airport Localizer Marker records
Length: 3 characters c-10
Character Type: Alpha

5.100 Minor Axis Bearing (MINOR AXIS TRUE BRG) c-7

Definition/Description: The "Minor Axis Bearing" field indicates the true bearing of the minor axis of marker beacons.

Source/Content: This field will contain the true bearing in degrees and tenths of a degree, with the decimal point suppressed.

Used On: Airport Localizer Marker records c-10
Length: 4 characters
Character Type: Numeric
Examples: 0900, 2715

5.101 Communications Type (COMM TYPE)

Definition/Description: The "Communications Type" field specifies the type of communication unit contained in the record. c-4

Source/Content: The field will contain one of the following entries.

5.101 Communications Type (COMM TYPE) (cont'd)

Field Content	Description	Airport Heliport Comm Only	Enroute Comm Only	Both Comm Type
ACC	Area Control Center			X
ACP	Airlift Command Post	X		
APP	Approach Control	X		
ARR	Arrival Control	X		
ATI	Automatic Terminal Info Service (ATIS)	X		
AWO	Automatic Weather Observing Service (AWOS)	X		
CLD	Clearance Delivery	X		
CPT	Clearance, Pre-Taxi	X		
CTA	Control Area (Terminal)	X		
CTL	Control			X
DEP	Departure Control	X		
DIR	Director (Approach Control Radar)	X		
EMR	Emergency			X
FSS	Flight Service Station			X
GND	Ground Control	X		
GTE	Gate Control	X		
HEL	Helicopter Frequency	X		
INF	Information			X
MUL	Multicom			X
OPS	Operations	X		
RDO	Radio			X
RDR	Radar			X
RFS	Remote Flight Service Station (RFSS)			X
RMP	Ramp/Taxi Control	X		
RSA	Airport Radar Service Area (ARSA)	X		
TCA	Terminal Control Area (TCA)	X		
TMA	Terminal Control Area (TMA)	X		
TML	Terminal	X		
TRS	Terminal Radar Service Area (TRSA)	X		
TWE	Transcriber Weather Broadcast (TWEB)		X	
TWR	Tower, Air Traffic Control	X		
UAC	Upper Area Control		X	
UNI	Unicom	X		
VOL	Volmet		X	

c-14

Used On: Enroute, Airport and Heliport Communications
Length: 3 characters
Character Type: Alpha

5.102 Radar (RADAR)

Definition/Description: The "Radar" field indicates whether or not the communications unit has access to information derived from primary or secondary radar and can use that information in fulfilling their assigned tasks.

Source/Content: The availability or radar capability will be drived from official government source documentation. If the communications unit has radar capabilities, the field will contain the character "R". If no capability exists, the field will contain the character "N".

c-10

Used On: Enroute, Airport and Heliport Communications records
Length: 1 character
Character Type: Alpha

5.103 Communications Frequency (COMM FREQ)

Definition/Description: The "Communications Frequency" field specifies a frequency for the facility identified in the "Communications Type" (5.101) field. c-8

Source/Content: Frequencies are derived from official government sources. HF frequencies are provide in 10 thousands, thousands, hundreds, tens and units of kilohertz (kHz) with trailing zeros in the tenths and hundreds position. VHF frequencies are provided in hundreds, ten, units, tenths, hundredths and thousandths of megahertz (MHz). UHF frequencies are provided in hundreds, ten, units, tenths and hundredths of megahertz (MHz). Decimal points are always suppressed.

c-10

c-14

Used On: Enroute, Airport and Heliport Communications records
Length: 7 characters
Character Type: Numeric
Examples: HF Frequencies - 0309500, 1794600
VHF Frequencies - 0123750, 0119700, 0126125
UHF Frequencies - 0028785, 0025350, 0026700

5.104 Frequency Units (FREQ UNIT)

Definition/Description: The "Frequency Units" field will designate the frequency spectrum area for the frequency in the "Communications Frequency" (5.103) field. c-10

Source/Content: This field contains the follow information.

Field Content	Description
H	High Frequency (3000 kHz - 30,000 kHz)
V	Very High Frequency (30,000 kHz - 200 MHz)
U	Ultra High Frequency (200 MHz - 3000 MHz)

Used On: Enroute, Airport and Heliport Communications records
Length: 1 character
Character Type: Alpha

 c-14

5.105 Call Sign (CALL SIGN)

Definition/Description: The "Call Sign" field specifies the name of the facility being called.

Source/Content: Call Signs are derived from official government sources. On airport Communications records, the type of facility being called will be omitted when is it the same as the communication type. On Enroute Communications records, the Call Name will be shown with the first record only of any Flight Information Region or Flight Service Station. c-8

Used On: Airport, Enroute Communications records
Length: 25 characters c-10
Character Type: Alpha/Numeric
Examples: COMM TYPE CALL NAME
APP LION ("APPROACH" is omitted)
TWR LION ("TOWER" is omitted)
DEP LONDON APPROACH
ACC DENVER CENTER

5.106 Service Indicator (SERV IND) c-8

Definition/Description: The "Service Indicator" field is used to further define the use of the frequency for the specified Communication Type (5.101).

Source/Content: The field may contain the following information:

c-14 AIRPORT COMMUNICATIONS RECORDS

Description	Column Content		
	27	28	29
Airport Advisory Service (AAS)	A		
Community Aerodrome Radio Station (CARS)	C		
Departure Service (Other than Departure Control Unit)	D		
Flight Information Service (FIS)	F		
Initial Contact (IC)	I		
Arrival Service (Other than Arrival Control Unit)	L		
Pre-Departure Clearance (Data Link Service)	P		
Aerodrome Flight Information Service (AFIS)	S		
Terminal Area Control (Other than dedicated Terminal Control Unit)	T		
Aerodrome Traffic Frequency (ATF)		A	
Common Traffic Advisory Frequency (CTAF)		C	
Mandatory Frequency (MF)		M	
Secondary Frequency		S	
Air/Ground			A
VHF Direction Finding Service (VDF)			D
Remote Communications Air to Ground (RCAG)			G
Language other than English			L
Military Use Frequency			M
Pilot Controlled Light (PCL)			P
Remote Communications Outlet (RCO)			R

c-8 c-10

ENROUTE COMMUNICATIONS RECORDS

Description	Column Content		
	57	58	59
Aeronautical Enroute Information Service (AEIS)	A		
Enroute Flight Advisory Service (EFAS)	E		
Flight Information Service (FIS)	F		
Air/Ground		A	
Discrete Frequency		D	
Air/Air		C	
Mandatory Frequency		M	
Secondary Frequency		S	
VHF Direction Finding Service (VDF)			D
Remote Communications Air to Ground (RCAG)			G
Language other than English			L
Military Use Frequency			M
Remote Communications Outlet (RCO)			R

c-10

Used On: Enroute, Airport and Helicopter Communications records
Length: 3 characters
Character Type: Alpha

5.107 ATA/IATA Designator (ATA/IATA)

Definition/Description: The "ATA/IATA" field contains the Airport/Heliport ATA/IATA designator code to which the data contained in the record relates.

Source/Content: The content of this field should be derived from IATA Reservations Manual Part II, IATA Resolution 763/Location Identifiers. c-8

Used On: Airport and Heliport records
Length: 3 characters
Character Type: Alpha
Examples: DEN, LHR, JFK

5.108 IFR Capability (IFR)

Definition/Description: The "IFR Capability" field indicates if the Airport/Heliport has any published Instrument Approach Procedures.

Source/Content: The field contains "Y" if there is an Official Government Instrument Approach Procedure published, otherwise the field will contain "N". (Note: The presence of "Y" in this field does not necessarily imply that the published instrument approach is coded in the data base.)

Used On: Airport and Heliport records
Length: 1 character
Character Type: Alpha

5.109 Runway Width (WIDTH)

Definition/Description: The width of the runway identified in the "Runway Identifier" field is specified in the "Runway Width" field. c-4

5.109 Runway Width (WIDTH) (cont'd)

Source/Content: Runway widths derived from Official Government Sources are entered into the field in feet, with a resolution of one foot. For runways of variable width, the minimum width encountered over the runway length will be entered.

Used On: Runway records
Length: 3 characters
Character Type: Numeric
Examples: 150, 300, 075

5.110 Marker Ident (MARKER IDENT)

Definition/Description: The "Marker Ident" field contains a unique computer ident assigned to each enroute marker.

Source/Content: A unique identifier will be created for each enroute marker since such idents are not designated by official sources. Marker idents will be established using the 2-character ICAO code followed by two numeric digits assigned to keep markers unique within a given ICAO region.

Used On: Enroute marker records
Length: 4 characters
Character Type: Alpha/Numeric
Examples: EG01, EG02, K101, K102

c-4 5.111 Marker Code (MARKER CODE)

Definition/Description: The "Marker Code" field contains the coded ident that provides an aural and visual indication of station passage in the cockpit. The code shall be keyed so as to transmit dots or dashes, or both, in an appropriate sequence on a radio frequency of 75 MHz. The frequency of the modulating tone is 3000 Hz.

Source/Content: The field contains the morse code ident (dots and dashes) derived from official government sources.

Used On: Enroute marker records
Length: 4 characters
Character Type: Alpha
Examples: .-., ..., - - - -

5.112 Marker Shape (SHAPE)

Definition/Description: The "Shape" field defines the radiation pattern of an airways marker as being either "bone" or "elliptical."

Source/Content: The field contains the shape of the marker derived from official government sources when available. The character "B" will designate the "bone" shape and the character "E" will designate the elliptical shape. "E" will be entered when the source does not supply shape information.

Used On: Enroute airways marker records
Length: 1 character
Character Type: Alpha

5.113 High/Low (HIGH/LOW)

Definition/Description: The "High/Low" field indicates the power of the enroute marker.

Source/Content: The field contains the power derived from official government sources. The character "L" indicates low power for use at low altitudes. The character "H" indicates high power for general use.

Used On: Enroute marker records
Length: 1 character
Character Type: Alpha

5.114 Duplicate Indicator (DUP IND)

Definition/Description: The "Duplicate Identifier" field is used to further define holding patterns when official government source has designated more than one Holding Pattern on a Navaid or Waypoint.

Source/Content: Holding Patterns are derived from official government sources documents. That documentation will normally specify the airspace structure in which the holding is to be used. That documentation may also designate more than one Holding Pattern for a single Navaid or Waypoint. This field will contain detail on airspace structure and multiple designations. More than one holding is designated on a single "fix" when one or more of the following elements different for holdings within the same airspace structure: Inbound Holding Course, Turn Direction, Altitude, Leg Length or Leg Time, and Holding Speed. c-10

If only one Holding Pattern is designated for a "fix" and the airspace structure in which that holding is to be used is not defined, the field will contain "00". If only one Holding Pattern is designated for a "fix" and the airspace structure in which that holding is to be used is defined or if the same holding is designated for more than one airspace structure, the first position of the "Duplicate Indicator" will contain a digit of 1 through 6 and the second position will contain a zero. If more than one holding is designated for a single "fix" in one type of airspace structure, the first position will contain a digit of 1 through 6 and the second position will contain a digit of 1 through 9, depending on the number of holdings on that "fix" within that airspace structure.

If multiple holdings are designated in official source documents for a single "fix" and the airspace structure is not defined for all holdings, those with "undefined airspace structure" will carry the digit 7 in position one and a digit of 0 through 9 in position two.

MULTIPLE HOLDING PATTERNS

Holding Pattern	Duplicate Indicator	
	Position One Airspace	Position Two Multiple
Undefined (None Defined)	0	See Note 1
High Altitude	1	See Note 1
Low Altitude	2	See Note 1
SID	3	See Note 1
STAR	4	See Note 1
Approach	5	See Note 1
Missed Approach	6	See Note 1
Undefined (with other defined)	7	See Note 1

c-14 c-10 Note 1: If there is only one holding pattern on a given fix within an airspace structure, position 2 will contain a "0". For additional (multiple) holdings on that same fix within the same airspace structure, position 2 will be incremented by 1, e.g. "0" for the first "1" for the second, etc.

Used On:	Holding Pattern Records
Length:	2 characters
Character Type:	Numeric
Examples:	00, 10, 61, 32

5.115 Directional Restriction

Definition/Description: The "Direction Restriction" field, when used on Enroute Airway records, will indicate the direction an Enroute Airway is to be flown. The "Direction Restriction" field, when used on Preferred Route records, will indicate whether the routing is available only in the direction of "from initial fix to terminus fix" or in both directions.

c-14 Source/Content: Direction Restrictions should be derived from official government sources. They will be coded and supplied as follows:

Enroute Airway Records

F = One way in direction route is coded (Forward).
B = One way in opposite direction route is coded (backward).
Blank = No restrictions on direction.

Preferred Route Records

F = Uni-directional Preferred Route, usable only from Initial Fix to Terminus Fix.
B = Bi-directional Preferred Route, usable from Initial Fix to Terminus Fix or from Terminus Fix to Initial Fix.

Used On:	Enroute Airway and Preferred Route Records
Length:	One character
Character Type:	Alpha

5.116 FIR/UIR Identifier (FIR/UIR IDENT)

Definition/Description: The "FIR/UIR Identifier" field identifies the Flight Information Region and Upper Information Region of airspace with defined dimensions within which Flight Information Service and Alerting Service are provided. The Identifier is for the controlling Area Control Center or Flight Information Center.

c-5 c-10 Source/Content: FIR/UIR Identifiers will be derived from official government sources. This field contains the four character identifier assigned to the airspace. For those areas charted as "NO FIR," the identifier field will contain "XX plus a two digit numeric."

When used on Flight Planning Continuation records, the entry will be related to the altitude structure. For records that are classed or designated as high altitude, the FIR field will be blank. For areas assigned a FIR identifier only that is valid for both the low altitude and the high altitude structure, the UIR field will be blank. For detail records classed or designated as low altitude and high altitude, both the FIR and the UIR identifier will be entered.

Used On:	FIR/UIR, VHF NAVAID, NDB NAVAID, Enroute, Terminal Waypoint, Airport Flight Planning Continuation and Heliport records c-8
Length:	4 characters
Character Type:	Alpha
Examples:	DAAG, SGAS, XX02 c-10

5.117 FIR/UIR Indicator (IND)

Definition/Description: The "FIR/UIR Identifier" field may contain the identifier of a FIR, UIR or combined FIR/UIR. This field indicates which one of these records is an element.

Source/Content:

Type	Field Entry
FIR	F
UIR	U
Combined FIR/UIR	B

Used On:	FIR/UIR and Enroute Communications records c-8
Length:	1 character
Character Type:	Alpha

5.118 Boundary Via (BDRY VIA)

Definition/Description: The "Boundary VIA" defines the path of the boundary from the position identified in the record to the next defined position. c-13

Source/Content: The path of the boundary will be determined from official government sources or the rule listed below and the "Boundary VIA" will be selected from the table below.

Field Content Position 1	Field Content Position 2	Description
A		Arc by edge
C		Circle
G		Great Circle
H		Rhumb Line
L		Counter Clockwise ARC
R		Clockwise ARC
	E	End of description, return to origin point

Application Rules:

1. Special Use Airspace designated as following rivers, country, state or other political boundaries will be averaged in coding by using a series of straight lines so that no path will be greater than two miles from the actual boundary. The Boundary VIA will be "G".

2. If there is a named waypoint on an airway which crossed an irregular FIR/UIR boundary, the waypoint coordinates will be used to define a point in the path defining that FIR/UIR boundary. The Boundary VIA will appropriate to the path definition.

5.0 NAVIGATION DATA - FIELD DEFINITIONS (cont'd)

5.118 Boundary Via (BDRY VIA) (cont'd)

3. Paths that follow lines of latitude will be coded with a Boundary Via of "H". Paths that follow lines of longitude may be coded with a Boundary Via of "G" or "H". Consistent use of one or the other with a single airspace is desired.

4. Other than for lines of latitude and longitude, the Boundary VIA of "H" shall only be used when specifically stated in the official government source. If not stated as "Rhumb Line" or not along latitude/longitude, all straight lines will be coded as "G".

Note: Refer to Figure 5-12 for sample coding of Boundary VIA Codes.

Used On: Controlled Airspace, FIR/UIR, and Restrictive Airspace records
c-5 Length: 2 characters
Character Type: Alpha

5.119 Arc Distance (ARC DIST)

Definition/Description: The "Arc Distance" field is used
c-6 to define the distance in nautical miles from the "Arc Origin" position to the arc defining the lateral boundary of a FIR/UIR or Restrictive Airspace.

Source/Content: ARC distances should be derived from official government sources when available, in nautical miles and tenths of nautical mile, with the decimal point suppressed. The field will be entered only when "Boundary Via" is "A," "C," "L," or "R".

c-13 Used On: FIR/UIR, Restrictive Airspace, and Controlled Airspace records
Length: 4 characters
Character Type: Numeric
Examples: 0080, 0150, 1000

5.120 Arc Bearing (ARC BRG)

c-5 Definition/Description: The "Arc Bearing" field contains the true bearing from the "Arc Origin" position to the beginning of the arc.

Source/Content: Arc bearings should be derived from
c-7 official government sources when available. The field contains true bearing in degrees and tenths of degree, with the decimal point suppressed. The field will only be entered when Boundary Via is "A," "C," "L" or "R".

c-13 Used On: FIR/UIR, Restrictive Airspace, and Controlled Airspace records
Length: 4 characters
Character Type: Numeric
Examples: 0900, 1800, 3450

5.121 Lower/Upper Limit

Definition/Description: Special Use Airspace is described by both lateral and vertical boundaries. The "Lower/Upper Limit" fields contain the lower and upper limits of the c-6
FIR/UIR or Restrictive Airspace being described.

Source/Content: Limits for the special use airspace should be derived from official government sources. The field may contain altitude (all numerics), flight levels (alpha/numerics) or an all alpha entry (see examples). The flight level entry will contain the alpha characters "FL" followed by the altitude in hundreds of feet. These fields will be entered on the first record only of each FIR/UIR or Restrictive Airspace being described.

Used On: FIR/UIR, Restrictive Airspace, and Controlled Airspace records c-13
Length: 5 characters
Character Type: Alpha/Numeric
Examples:
- All numeric: 05000, 25000
- Alpha/numeric: FL245, FL450
- All alpha: NOTSP (for Not Specified) c-7
  UNLTD (for unlimited)
  GND (for Ground)
  MSL (for Mean Sea Level)
  NOTAM (for Restrictive Airspace only)

5.122 FIR/UIR ATC Reporting Units Speed (RUS)

Definition/Description: The "FIR/UIR ATC Reporting Units Speed" is used to indicate the units of measurement concerning True Air Speed used in the specific FIR/UIR to fulfill the requirements of ICAO flight plan. c-5

Source/Content: FIR/UIR Reporting Units should be derived from official government publications. The field will be entered on the first record only for each FIR/UIR identifier.

Reporting Units	Field Entry
Not specified	0
TAS in Knots	1
TAS in Mach	2
TAS in Kilometers/hr	3

Used On: FIR/UIR records
Length: 1 character
Character Type: Numeric

5.123 FIR/UIR ATC Reporting Units Altitude (RUA)

Definition/Description: The "FIR/UIR ATC Reporting Units Altitude" field is used to indicate the units of measurement concerning the altitude used in the specific FIR/UIR to fulfill the requirements of ICAO flight plan.

Source/Content: FIR/UIR Reporting Units should be derived from official government publications. The field will be entered on the first record only for each FIR/UIR identifier.

Reporting Units	Field Entry
Not specified	0
ALT in Flight Level	1
ALT in Meters	2
ALT in Feet	3

Used On: FIR/UIR records
c-5 Length: 1 character
Character Type: Numeric

5.124 FIR/UIR Entry Report (ENTRY)

Definition/Description: The "FIR/UIR Entry Report" field is used to indicate whether an entry report on ICAO flight plan is required for that specific FIR/UIR.

Source/Content: FIR/UIR Entry Report should be derived from official government publications. "Y" in this field indicates Entry Report is required, "N" in this field indicates no Entry Report is required. The field will be entered on the first record only for each FIR/UIR identifier.

Used On : FIR/UIR records
Length : 1 character
Character Type: Alpha

5.125 FIR/UIR Name

Definition/Description: The "FIR/UIR Name" field contains the official name of the controlling agency of the FIR/UIR of which this record is an element.

c-5 Source/Content: The FIR/UIR name will be derived from official publications. The areas without a specific "FIR/UIR" designation will be labeled "NO FIR".

Used On: FIR/UIR records
Length: 25 characters
Character Type: Alpha/numeric
Examples: ACCRA, FIR, ASUNCION FIR/UIR, NO FIR

5.126 Restrictive Airspace Name

Definition/Description: The "Restrictive Airspace Name" field will contain the name of the restrictive airspace when assigned.

Source/Content: Names will be derived from official government sources. The name, if assigned, will be entered in the first record only. If source does not assign a name, this field may be blank.

Used On: Restrictive Airspace records
Length: 30 characters
Character Type: Alpha/numeric
Examples: RANDOLPH ONE MOA,SAMBURU GAME RESERVE

5.127 Maximum Altitude (MAX ALT)

Definition/Description: The "Maximum Altitude" field is used to indicate the maximum altitude allowed. c-5

Source/Content: Maximum altitudes should be derived from official government publications describing the upper limit of the airway in feet or flight level.

Used On: Enroute Airway, Holding Pattern and Preferred Route records c-9
Length: 5 characters
Character Type: Alpha/numeric
Examples: c-8
All numeric: 17999, 08000
Alpha/numeric: FL100, FL450
All alpha: UNLTD (for unlimited)

5.128 Restrictive Airspace Type (REST TYPE)

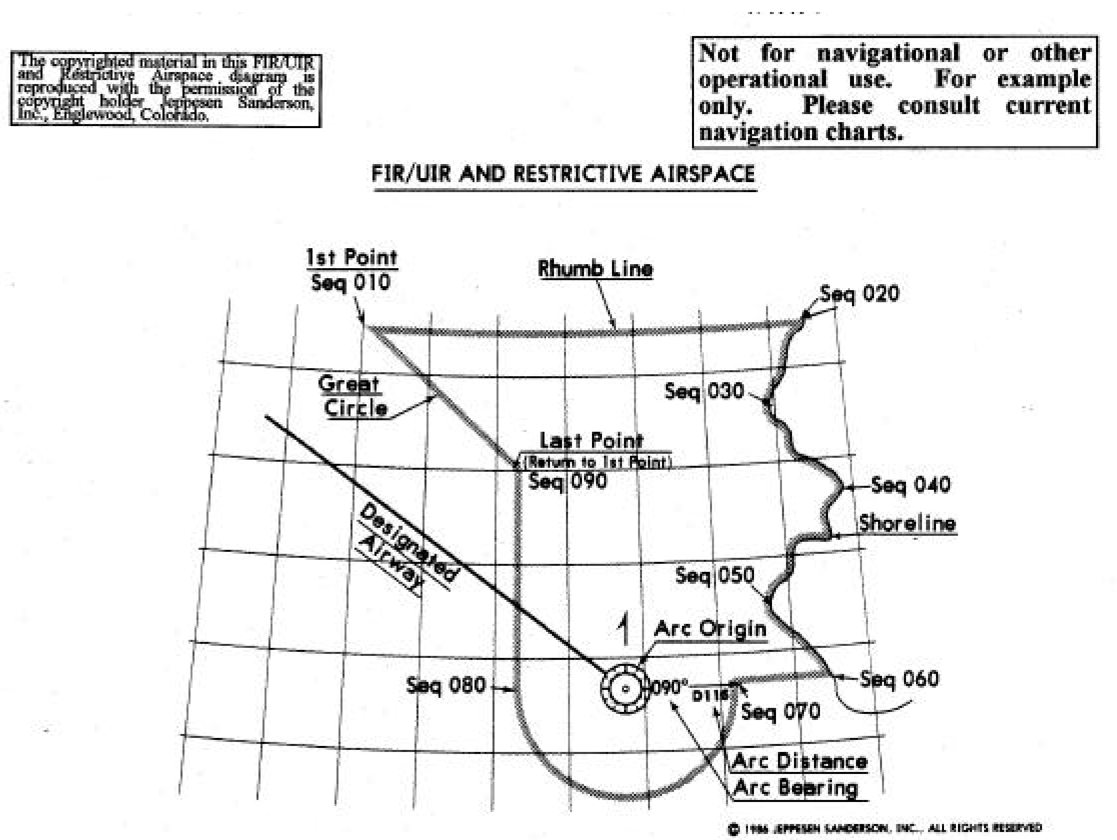
Definition/Description: The "Restrictive Airspace Type" field is used to indicate the type of Airspace in which the flight of aircraft is prohibited or restricted. The restriction may be continuous or specified for certain times.

Source/Content: The "Restrictive Airspace Type" should be derived from official government publications. c-5

Type	Field Entry
Alert	A
Caution	C
Danger	D
Military Operations Area	M
Prohibited	P
Restricted	R
Training	T
Warning	W
Unspecified or Unknown	U

c-7

Used On: Restrictive Airspace and Enroute Airway Flight Planning Continuation records c-5
Length: 1 character
Character Type: Alpha



Seq No.	Boundary Via	Latitude	Longitude	Arc Origin Latitude	Arc Origin Longitude	Arc Dist	Arc Brg
010	H	N45-00-00	W060-00-00				
020	G	N45-00-00	W047-00-00				
030	G	N43-12-45	W048-05-00				
040	G	N41-18-24	W046-16-12				
050	G	N38-58-54	W048-30-36				
060	H	N37-20-15	W047-00-00				
070	R	N37-20-15	W049-31-00	N37-20-18	W052-30-30	115	090
080	H	N37-20-15	W055-30-00				
090	G	N42-00-00	W055-30-00				

Figure 5-12
Controlled and Restrictive Airspace and FIR/UIR Boundaries

5.129 Restrictive Airspace Designation

Definition/Description: The "Restrictive Airspace Designation" field contains the number or name that uniquely identifies the restrictive airspace.

Source/Content: The identifiers will be derived from
c-5 official government sources. The field will contain a numeric number, or when designation is by name this field will contain the name up to 10 characters. When name is longer than 10 characters, the 10th position will contain an asterisk indicating the name field should be used for the full designator.

Used On: Restrictive Airspace and Enroute Airway Flight Planning Continuation records
c-7 Length: 10 characters
Character Type: Alpha/numeric

c-5

Field Entry			
Charted Designator	ICAO	Type	Rest. Desig.
RJ(R)-116	RJ	R	116
R-2524	K2	R	2524
Crystal MOA	K4	M	Crystal
Randolph MOA One B	K4	M	Randolph*

c-10

5.130 Multiple Code (MULTI CD)

Definition/Description: The "Multiple Code" field will be
c-7 used to indicate Restrictive Airspace Areas or MSA Centers having the same designator but subdivided or differently divided by lateral and/or vertical detail.

Source/Content: This field will be used when official government publications for Restrictive Airspace divides an area with the same designator into different areas of Activation, altitude or other defining characteristics. For MSA Centers, this provides different sectorication and/or
c-8 altitudes for the MSA published with the same center. The field will contain an alpha character uniquely identifying each area or MSA. The first record affected could contain the character "A" and multiple primary records could contain the character "B," "C," "D," etc., as required.

Used On: Controlled Airspace. Restrictive
c-14 Airspace, Airport and Heliport MSA Center, Airport and Heliport SID/STAR/Approach and Enroute Airway Flight Planning Continuation
c-13 Records.
Length: 1 character
Character Type: Alpha

5.131 Time Code (TIME CD)

Definition/Description: When used on the Primary Record of the possible record types, with the exception of Enroute Airway Restriction Records, this field is used to
c-14 identify that the record in question is continuous or the times are other than continuous and are shown in a Continuation Record. When used on a Continuation Record, other than the Enroute Airway Restriction Records, this field is used to indicate how the "Time of Operation Fields" are to be interpreted. When used on Enroute Airway Restriction Primary and Continuation Records, this field identifies either a continuous situation or a non-continuous situation, the detail for which is contained in the same record as the Time Code. c-14

c-9

Source/Content: Active times are derived from official government source. The field will contain an alpha character for which an associated description has been defined as indicated in the tables below.

Used on: Restrictive Airspace, Restrictive Airspace Continuation, Preferred Route, Preferred Route Continuation, Airport, Heliport and Enroute Communication Airport, Heliport and Enroute Communication Continuation records c-14

	PRIMARY RECORDS
Field Entry	Description
C	Active Continuously, including holidays
H	Active Continuously, excluding holidays
N	Active Non-Continuously, Refer to Continuation Record
Blank	Active times announced by NOTAM
	CONTINUATION RECORDS
H	Active times are provided in Time of Operation format and exclude holidays
N	Activation Times are too complex for Time of Operation format and are provided in Note Form
T	Active times are provided in Time of Operation format and include holidays

c-10

Used on: Enroute Airway Restriction Primary and Continuation Records

	PRIMARY AND CONTINUATION RECORDS
Field Content	Description
C	Active Continuously, including holidays
H	Active Continuously, excluding holidays
S	Active times are provided in Time of Operation format and exclude holidays
T	Active times are provided in Time of Operation format and include holidays

c-14

Length: One character
Character Type: Alpha

5.132 NOTAM

Definition/Description: Restrictive Airspace areas may not have established active times and are activated by NOTAM or may be active by NOTAM in addition to established times. c-13

Source/Content: Active times by NOTAM will be derived from official government source. When used on primary records, the area is active only by NOTAM and there will be no continuation record. When used on continuation records, the area is active by NOTAM in addition to the established times. The field will contain the alpha character "N" to indicate either condition, otherwise the field will be blank.

5.132 NOTAM (cont'd)

Used On:	Controlled Airspace, Restrictive Airspace and Restrictive Airspace Continuation records
Length:	1 character
Character Type:	Alpha

5.133 Unit Indicator (UNIT IND)

c-13

Definition/Description: Restrictive Airspace lower and upper limits are specified as "above mean sea level" (MSL) or "above ground level" (AGL). This field permits the unit of measurement to be indicated.

Source/Content: The units of lower and upper limits are derived from official government source. The alpha character "M" will indicate MSL and the alpha character "A" will indicate AGL.

Used On:	Controlled Airspace, Restrictive Airspace records
Length:	1 character
Character Type:	Alpha

5.134 Cruise Table Identifier (CRSE TBL IDENT)

c-5

Definition/Description: A standard cruising level table is established by ICAO and is to be observed except when, on the basis of regional air navigation agreements, a modified table of cruising levels is prescribed for use. This field permits the enroute airway record to identify the Cruise Table record that is to be used for cruise levels.

c-7 c-6

Source/Content: Cruise Levels will be derived from official government sources. For the standard ICAO cruise table this field will contain the alpha characters "AA". For those countries not using the standard ICAO table and having a modified table this field will contain the alpha characters "BB," "CC," etc. If a country uses the standard ICAO table or a Modified table but indicates that an airway or portion of an airway is to be flown opposite of the cruise table, the field will contain alpha/numeric characters that identify the table to be used.

c-14

Used On:	Enroute Airway, FIR/UIR, Cruise Table and Flight Planning Arrival/ Departure Data Records
Length:	2 characters
Character Type:	Alpha/numeric
Example:	

c-6

Field Entry	Description
AA	ICAO standard cruise table
AO	Exception to ICAO cruise table
BB - ZZ	Modified cruise table
BO - ZO	Exception to modified cruise table

5.135 Course FROM/TO

c-7

Definition/Description: The "Course From" field is used to indicate the lowest course for which a block of cruising levels are prescribed. The "Course To" field is used to indicate the highest course for which a block of cruising levels is prescribed.

c-5

Source/Content: The Courses will be derived from official government sources in degrees and tenths of degree with the decimal point suppressed. The Magnetic/True indicator field will be used to indicate True (T) or Magnetic (M) courses.

Used On:	Cruising Table records
Length:	4 characters
Character Type:	Numeric
Examples:	0000, 1790, 3590

5.136 Cruise Level From/To

Definition/Description: The "Cruise Level From" field is used to indicate the lowest cruising level prescribed for use within the Course From/To fields. The "Cruise Level To" field is used to indicate the highest cruising level prescribed for use within the Course From/To fields.

c-7

Source/Content: Cruise Levels will be derived from official government sources. When the level is entered in feet the field will be all numerics. When the level is entered in meters, the first column will contain the alpha character "M" followed by all numerics. If the "Level To" is unlimited, the field will contain the alpha characters "UNLTD".

c-5

Used On:	Cruising Table records
Length:	5 characters
Character Type:	Alpha/numeric
Examples:	0200, M0600, M1585

5.137 Vertical Separation

Definition/Description: The "Vertical Separation" field is used to indicate the minimum separation prescribed to be maintained between the cruising levels.

Source/Content: Vertical Separation Values will be derived from official government sources and entered in feet or tens of meters with "M" in the first column.

Used On:	Cruising Table records
Length:	5 characters
Character Type:	Alpha/numeric
Examples:	01000, 02000, M0030, M0060

5.138 Time Indicator (TIME IND)

c-10 c-14

Definition/Description: The "Time Indicator" field is used to indicate whether the times shown in the "Time of Operations" field(s) are Local Time, Daylight Savings Time or Universal Coordinated Time.

c-10

Source/Content: Time contained in the affected record(s) is derived from official government sources. The "Time Indicator" will qualify those source derived times as indicated in the following table:

Field Entry	Description
T	Times codes are Local Time
S	Times codes are to be adjusted for Daylight Savings Time
Blank	Times shown are Universal Coordinated Time (UTC)

c-14

5.0 NAVIGATION DATA - FIELD DEFINITIONS (cont'd)

c-13

c-14

Used On:	Controlled Airspace, Restrictive Airspace Continuation, Referred Route Continuation, Enroute Airway Restriction, Airport and Heliport Communication Continuation and Enroute Communications Continuation Records
Length:	One character
Character Type:	Alpha

c-10

5.139 Intentionally Left Blank

5.140 Controlling Agency

c-9

Definition/Description: Some "Restrictive Airspace" areas are designated joint use and IFR operations in the area may be authorized by the controlling agency when it is not being utilized by the using agency.

Source/Content: The name of the Controlling Agency should be derived from official government sources and will be shown on the first record only. If no Controlling Agency is specified the field may be blank.

Used On:	Controlled Airspace, Restrictive Airspace Continuation record
Length:	25 characters
Character Type:	Alpha/numeric
Examples:	LAX, ARTCC, Lumpur ACC, Butterworth APP

5.141 Starting Latitude

c-5

Definition/Description: The Grid MORA Table will contain records describing the MORA for each Latitude and Longitude block. Each record will contain thirty blocks and the "Starting Latitude" field defines the lower left corner for the first block of each record.

Source/Content: The "Starting Latitude" will be determined when the record is assembled.

Used On:	Grid Mora record
Length:	3 characters
Character Type:	Alpha/numeric
Examples:	N00, N42, S20, S90

5.142 Starting Longitude

Definition/Description: The Grid MORA table will contain records describing the MORA for each Latitude and Longitude block. Each record will contain thirty blocks and the "Starting Longitude" field defines the lower left corner for the first block of each record.

Source/Content: The "Starting Longitude" will be determined when the record is assembled.

Used On:	Grid Mora records
Length:	4 characters
Character Type:	Alpha/numeric
Examples:	E000, W150, E090, W180

5.143 MORA

Definition/Description: Minimum Off-route Altitude provides terrain and obstruction clearance within the section outlined by latitude and longitude blocks. c-5

Source/Content: A MORA of 7,000 feet or less clears all known obstructions and terrain by 1,000 feet; a MORA greater than 7,000 feet clears all terrain by 2,000 feet. The field will contain values in hundreds of feet. For areas that are unsurveyed the field will contain the alpha characters "UNK".

Used On:	Grid Mora record
Length:	3 characters
Character Type:	Alpha/numeric
Examples:	071, 100, 123, UNK

5.144 Center Fix (CENTER FIX)

Definition/Description: When used on Airport and Heliport MSA Records and specific terminal procedure records, the "Center Fix" field represents the MSA Center, that point (Navaid or Waypoint) on which the MSA is predicated. When used on Terminal Procedure Records incorporating an "RF" Path and Termination, the field represents the point (Terminal Waypoint) which defines the center of the arc flight path. c-14

Source/Content: When used as "MSA Center," the field will contain the identification of the navigation facility or Enroute or Terminal Waypoint or Runway upon which the MSA coverage radius is predicated. Such content will be derived from official government sources. When use as "ARC Center," the field will contain the identification of the Terminal Waypoint used to define the arc. ARC Center waypoints can only appear in the Airport Terminal Waypoint or Heliport Terminal Waypoint Section/Subsections. c-11 c-14 c-11

c-14

Used On:	Airport and Heliport MSA Records, Airport and Heliport SID/STAR/Approach Records
Length:	5 characters max.
Character Type:	Alpha/numeric
Examples:	HOM, YXRNB, MM18, ARC02

c-11

Figure 5-13 GRID MORA Sample

SEC CODE	SUB CODE	START LAT	START LONG	MORA	MORA	MORA	MORA	MORA	MORA	MORA	MORA
A	S	N00	E000	010	010	010	010	010	010	090	191
A	S	N01	E000	010	010	010	010	010	010	010	082
A	S	N02	E000	010	010	010	010	010	010	010	073
A	S	N03	E000	010	010	010	010	010	010	010	073
A	S	N04	E000	010	010	010	010	010	015	UNK	049
A	S	N05	E000	026	014	010	010	014	020	UNK	042
A	S	N06	E000	049	024	020	019	026	029	029	042
A	S	N07	E000	UNK	040	033	031	038	043	035	040
A	S	N08	E000	041	037	033	035	035	034	035	UNK
A	S	N09	E000	029	045	030	035	027	032	033	UNK
A	S	N10	E000	030	034	029	028	028	032	043	UNK
A	S	N11	E000	030	034	031	032	025	041	046	UNK
A	S	N12	E000	026	029	029	022	024	028	043	UNK
A	S	N13	E000	026	030	030	030	026	026	030	UNK
A	S	N14	E000	031	031	024	030	023	040	034	UNK
				E000	E001	E002	E003	E004	E005	E006	E029

c-5

The table shows a sample of the Grid Mora Table as it would appear in the file. The table starts at N00/E000 and ends at N14/E029, and is blocked at intervals of sixty minutes. The values shown in the Start Lat and Start Long fields are the lower left corner of a one degree Lat/Long box. The values shown at the bottom of the table are for illustration purpose only and show the Longitude of the lower corner for the MORA values in the table. The values from longitude E007 thru E028 have been omitted from this illustration.

5.145 Radius Limit

c-11

Definition/Description: The altitude shown in the "Sector Altitude" field provides a 1000 foot obstacle clearance with a specified radius from the navigational facility/fix. The "Radius Limit," field allows the radius to be specified.

Source/Content: Radius limits will be derived from official government sources. Values will be shown in whole nautical miles.

c-14 Used On: Airport and Heliport MSA Records
Length: 2 characters
c-11 Character Type: Numeric
Examples: 25, 30

5.146 Sector Bearing (SEC BRG)

Definition/Description: MSA is shown in a circle. When segments have different altitudes the dividing lines are shown as Sector Bearings toward the facility identified in the "Ident" field.

c-5

Source/Content: The "Sector Bearing" will be derived from official government sources. Each section requires three fields for definition. The first "Sector Bearing" shows the beginning bearing, in whole degrees, of the sector being defined. The second field "Sector Altitude" specifies the altitude for the sector and the third field "Sector Bearing" shows the end bearing, in whole degrees, of the sector being defined and is also the beginning bearing of the next sector to be defined. If the MSA is one sector or a complete circle, the first sector bearing field will contain the numeric "180".

c-14 Used On: Airport and Heliport MSA Records
Length: 3 characters
Character Type: Numeric
Examples: 060, 045, 090

5.147 Sector Altitude (SEC ALT)

c-5

Definition/Description: The altitude shown in the "Sector Altitude" field provides a 1000 foot obstacle clearance within a specified radius from the navigational facility/fix.

Source/Content: Altitudes will be derived from official government sources. Values will be shown in hundreds of feet.

Used On: Airport and Heliport MSA Records
c-14 Length: 3 characters
Character Type: Numeric
c-5 Examples: 010, 025, 100

5.148 Enroute Alternate Airport (EAA)

Definition/Description: The "Enroute Alternate Airport" field identifies the most suitable emergency airport along a Company Route.

c-5

Source/Content: This field is determined by the user airline and will contain the Airport ICAO Ident.

Used On: Company Route records
Length: 4 characters
Character Type: Alpha/numeric
Examples: KDEN, EGKK, EDFF

5.149 Figure of Merit (MERIT)

Definition/Description: The "Figure of Merit" field is used to specify VHF NAVAID facility usable ranges beyond that specified in the Class field. It is also used to specify when a VHF NAVAID contained the database is not available for operational use, e.g. is out of service.

Source/Content: Actual Field Entry Values are not contained in official government source but rather are derived values based on usage, class, etc. These may be further adjusted by input from actual users. The content will be as defined in the table below.

c-13

Field Entry	Description
0	Terminal Use (generally within 25NM)
1	Low Altitude Use (generally within 40NM)
2	High Altitude Use (generally within 130NM)
3	Extended High Altitude Use (generally beyond 130NM)
9	Out of Service

Used On: VHF Navaid Records
Length: 1 character
Character Type: Numeric

5.150 Frequency Protection Distance (FREQ PRD)

Definition/Description: The "Frequency Protection Distance" field provides an indication of the distance to the next nearest NAVAID on the same frequency.

Source/Content: The distance to the next NAVAID will be computer generated values. Values will be entered on NAVAID with DME or TACAN equipped facilities only and will indicate the distance, in nautical miles, to the next nearest DME or TACAN equipped facility. Maximum relevant value will be 600 nautical miles. c-5

Used On : VHF Navaid records
Length : 3 characters
Character Type: Alpha/numeric
Examples : 030, 150, 600

5.151 FIR/UIR Address (ADDRESS) c-5

Definition/Description: The "FIR/UIR Address" field contains the four character communications address of the FIR/UIR to supplement the FIR/UIR Ident.

c-9 c-10

Source/Content: When addressing ATS messages to the ATS Center in charge of a FIR or UIR, a three-letter designator followed by a filler of "X" or by a letter representing a department or division within the organization addressed should be used. The three-letter designators are to be those defined in ICAO Document 8585, Designators for Aircraft Operating Agencies, Aeronautical Authorities 2 and Services. ICAO Document 7910, Location Indicators, Address of Centers in charge of FIR/UIR, states that when addressing ATS messages to the ATS Center in change of a FIR or a UIR, one of the following designators should be added to the location indicator to complete the addressee indicator:

5.0 NAVIGATION DATA - FIELD DEFINITIONS (cont'd)

5.151 FIR/UIR Address (ADDRESS) (cont'd)

If the message is related to an IFR Flight -- ZQZX
If the message is related to a VFR Flight -- ZFZX

To satisy this requirement, unless otherwise stipulated by
c-9 the user, the following address codes will be used:

ZOZX if related to an Oceanic FIR/UIR.
ZRZX if related to all other FIR/UIRs.

Used On:	FIR/UIR and Enroute Communications records
Length:	4 characters
Character Type:	Alpha
Examples:	ZOZX, ZRZX

5.152 Start/End Indicator (S/E IND)

Definition/Description: The "Start/End Indicator" field is used to indicate if the "Start/End Date" field is the effective start date, effective end date or the effective date for a change of the Primary record.

Source/Content:

Field Entry	Description
C	Change Date
E	End Date
S	Start Date

c-5

Note: If the Start/End Indicator field contains the alpha character "C" then the following continuation record is paired with it and the record will contain only the new values in the changed fields. All other fields will be blank.

Used On:	Restrictive Airspace, VHF NAVAID, NDB NAVAID, Enroute, Terminal Waypoint, Airport Flight Planning Continuation and Heliport records
Length:	1 character
Character Type:	Alpha

c-8

5.153 Start/End Date

Definition/Description: The "Start/End Date" when used on Continuation records specifies the effective Start/End date for a specific primary record when the effective date does not correspond with the AIRAC date. When used on Restriction records the Start and End dates specifies when the restrictions are in effect.

Source/Content: Effective dates will be derived from official government sources indicating the date/time in GMT of the effective date of the record or the effective times of the restriction. Default of the Start date is the current GMT date and default of the End date is forever.

c-8 Used On:	
Length:	11 characters
Character Type:	Alpha/numeric
Examples:	12JAN840000, 28SEP841200

5.154 Restriction Identifier (REST IDENT)

Definition/Description: The "Restriction Identifier" is used to assign a unique identifier to a restriction record and to multiple restrictions records for a particular route or route segment.

Source/Content: Restriction Identifiers are assigned c-6
during the data file assembly. Initially the identifier will be assigned in sequence with the first restriction assigned the numeric value "001," the second "002," the third "003," etc. If a restriction record is removed, only that record is deleted and there will be no effect on the other identifiers for that airway; i.e., if record "002" is deleted, records "001" and "003" will retain their identifiers. If a new restriction is added, within a few cycles of the deletion of "002," it will use the next higher number even if there are gaps in the sequence of identifiers.

Used On:	Airway Restriction and Airway Restriction Continuation records
Length:	3 characters
Character Type:	Numeric
Examples:	001, 002, 003

5.155 Intentionally Left Blank

5.156 Intentionally Left Blank

5.157 Airway Restriction Start/End Date (START/END DATE)

Definition/Description: The "Airway Restriction Start Date" field is used to indicate the earliest GMT date at which the restriction takes effect. The "Airway Restriction End Date" is used to indicate the latest GMT date at which the restriction is still in effect. This date information may be supplemented by "Time of Operation" information contained in an Airway Restriction Record, Type "AE" or "TC". When no "AE" or "TC" record exists for the Restriction Identifier, the
Start time is 0000 GMT and the end time is 2359 GMT c-10
of the dates indicated.

Source/Content: When entered, start dates and end dates will be in the format DDMMMYY. If the YY portion is equal to blanks, the restriction is valid every year. When the start date is equal to blanks, the restriction is valid with immediate affect. When the end date is equal to blanks, the restriction is valid until further notice.

Used On:	Enroute Airway Restriction records
Length:	7 characters
Character Type:	Alpha/numeric
Examples:	15JAN92, 15 JAN (blank)

Restrictive Airspace, VHF NAVAID, NDB NAVAID, Enroute,

5.158 Intentionally Left Blank

5.159 Intentionally Left Blank

5.160 Units of Altitude (UNIT IND)

Definition/Description: The "Units of Altitude" field is used to indicate the units of measurement for the values in the "Restriction Altitude" fields.

Source/Content: The actual values are derived from official government sources and expressed as one of the following codes.

Field Entry	Description
F	Restriction Altitudes are expressed in hundreds of feet
K	Restriction Altitudes are expressed in metric Flight Levels
L	Restriction Altitudes are expressed in feet Flight Levels
M	Restriction Altitudes are expressed in tens of meters

c-6

Used On: Airway Restriction records and Airway Restriction Continuation Records
Length: 1 character
Character Type: Alpha

c-4 5.161 Restriction Altitude (RSTR ALT)

Definition/Description: The "Restriction Altitude" fields are used to specify the altitude profile for a specific restriction.

c-10 Source/Content: Altitudes will be derived from official government sources and entered in hundreds of feet, tens of meters, standard or metric Flight Levels. The units used are determined through the "Units of Altitude" field. Altitudes are expressed in ascending order. All altitude fields after a "blank" altitude will also be blank.

Used On: Airway Restriction, Airway Restriction Continuation records
Length: 3 characters
Character Type: Numeric
Examples: 310 (standard FL310 or metric FL3199m or 31000 feet or 3100 meters)
090 (standard FL90 or metric FL900m or 9000 feet or 900 meters)

5.162 Step Climb Indicator (STEP)

Definition/Description: The "Step Climb Indicator" field is used to indicate if step climb up or down is permitted.
Source/Content:

Field Entry	Description
B	Step climb up or down is permitted
D	Only step climb down is permitted
N	No step climb is permitted
U	Only step climb up is permitted

c-6

Used On: Airway Restriction and Airway Restriction Continuation records
Length: 1 character
Character Type: Alpha

5.163 Restriction Notes

Definition/Description: The "Restriction Notes" field may contain any restriction not otherwise covered by the altitude or time restriction.

Source/Content: Restriction notes will be derived from official government sources.

Used On: Airway Restriction continuation records
Length: 104 characters
Character Type: Alpha/Numeric
Examples: AVAILABLE FOR WESTBOUND DEPARTURES FROM GATWICK. EASTBOUND AND OVER-FLIGHTS BY ATC ONLY. REROUTING MUST BE EXPECTED MON-FRI 1800-2400 DUE TO MILITARY TRAFFIC.

5.164 EU Indicator (EU IND)

Definition/Description: The "EU Indicator" field is used to identify those Enroute Airway records that have an Airway Restriction record without identifying the restriction.

Source/Content: The field will contain the alpha character "Y" when a restriction for the segment is contained in the restriction file or a blank when no restriction record exists. c-6

Used On: Enroute Airways records
Length: 1 character
Character Type: Alpha

5.165 Magnetic/True Indicator (M/T IND)

Definition/Description: The "Magnetic/True Indicator" field is used to indicate if the "Course From" and "Course To" fields of the Cruise Table record and the "Sector Bearing" fields of the MSA record are in magnetic or true degrees. It is also used in the Airport Record to indicate that all detail and procedures for that airport are included in the data base with a reference to either Magnetic North or True North. The field is blank in Airport Record when the data base contains a mix of magnetic and true information for the airport.

Source/Content: Cruise Table Courses and MSA Sector Bearings will be derived from official government source. The field will contain the alpha character "M" if the Course From/To or Sector Bearings are magnetic. It will contain the alpha character "T" if the courses/bearings are true. In Airport Records, the field will contain the alpha character "M" if all detail and procedure for the airport are reported in magnetic bearing, the alpha character "T" if all detail and procedure for the airport are reported in true bearing. The field will be "blank" if details and procedures are provided in both magnetic and true for the airport. In such cases the individual detail or procedure records will contain the "magnetic" or "true" information. c-10

Used On: Airport, Heliport, Cruise Table and Airport and Heliport MSA Records c-14
Length: 1 character
Character Type: Alpha

5.166 Channel

Definition/Description: The "Channel" field specifies the channel of the Azimuth, Elevation and Data transmissions for the MLS identified in the "MLS Identifier" field of the record. c-10

5.0 NAVIGATION DATA - FIELD DEFINITIONS (cont'd)

5.166 Channel (cont'd)

Source/Content: Channels are derived from official government sources and range from 500 to 699.

Used On: MLS records
Length: 3 characters
c-7 Character Type: Numeric

5.167 MLS Azimuth Bearing (MLS AZ BRG)
MLS Back Azimuth Bearing (MLS BAZ BRG)

Definition/Description: The "MLS Azimuth Bearing" and the "MLS Back Azimuth Bearing" fields define the inbound magnetic final approach course of the MLS Azimuth and the MLS Back Azimuth facility described in the record.

Source/Content: MLS bearings derived from official government sources are entered into the field in degrees and tenths of degrees with the decimal point suppressed.
c-10 For MLS Azimuth or Back Azimuth charted with true courses, the last character of this field will contain a "T" in place of tenths of a degree.

Used On: MLS and MLS Continuation records
Length: 4 characters
Character Type: Numeric
Examples: 0550, 0155, 015T

5.168 Azimuth Proportional Angle Right/Left (AZ PRO RIGHT/LEFT)

Back Azimuth Proportional Angle Right/Left (BAZ PRO RIGHT/LEFT)

Definition/Description: The "Azimuth Proportional Angle" fields define the limits of proportional guidance of the azimuth transmitter signal on the right and left side of the final approach course flight track. The BAZ is identical to the AZ and also provides guidance for missed approaches and departures. See figure under Section 5.172.

Source/Content: Azimuth Proportional angles will be derived from official government publications and entered in whole degrees.

Used On: MLS and MLS Continuation records
c-7 Length: 3 characters
Character Type: Numeric
Examples: 040, 025, 015

5.169 Elevation Angle Span (EL ANGLE SPAN)

Definition/Description: The "Elevation Angle Span" field defines the scan of the elevation transmitter signal between the lower and upper limits.

Source/Content: Elevation angle span limits will be derived from official government publications and entered in degrees and tenths of degrees with the decimal point suppressed.

Used On: MLS records
Length: 3 characters
Character Type: Numeric
Examples: 300, 150

5.170 Decision Height (DH)

Definition/Description: The "Decision Height" fields are used to specify a specific height 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.

Source/Content: Decision Height information is obtained from official government publications and will be the ILS CAT I barometric related value. The field will contain a numeric value expressed in feet above touchdown, with a resolution of one foot. This value is also referred to as "Height Above Touchdown" (HAT), a figure which, when added to the touchdown zone, runway end or threshold elevation, will give the Decision Altitude in feet above mean sea level. These fields will be shown on the first record of the final approach only and may be blank if Minimum Descent Altitude fields are entered.

Used On: Airport and Heliport Approach Continuation Records.
Length: 4 characters
Character Type: Alpha/numeric c-7
Examples: 0200

5.171 Minimum Descent Height (MDH)

Definition/Description: The "Minimum Descent Height" fields specify the lowest height, expressed in feet, to which descent is authorized on final approach or during circle-to-land maneuvering in execution of a standard instrument approach procedure where no electric glide slope is provided.

Source/Content: Minimum Descent Height information is obtained from official government publications. The field will actually contain a figure expressed in feet above the airport elevation, with a resolution of one foot. This value is also referred to as "Height Above Airport" (HAA), a figure which, when added to the airport elevation, will give the Minimum Descent Altitude in feet above mean sea level. These fields will be shown on the first record of the final approach only and may be blank if Decision Height fields are entered.

Used On: Airport and Heliport Approach Continuation Records. c-14
Length: 4 characters
Character Type: Alpha/numeric
Examples: 0314, 0514

5.172 Azimuth Coverage Sector Right/Left (AZ COV RIGHT/LEFT)

Back Azimuth Coverage Sector Right/Left (BAZ COV RIGHT/LEFT) c-7

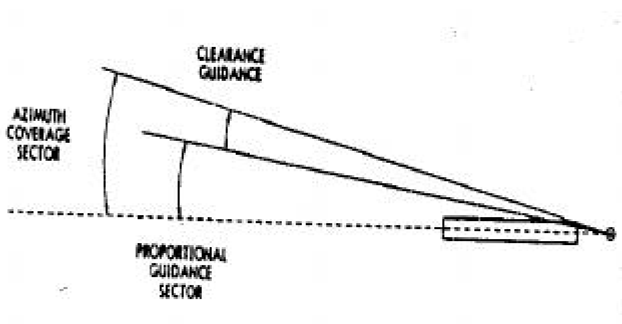
Definition/Description: The "Azimuth Coverage Sector" fields define the limit of the azimuth transmitter signal on the right and left side of the final approach course flight track. The Back Azimuth Coverage Sector is identical to the Azimuth Coverage Sector and also provides guidance for missed approaches and departures.

Source/Content: Azimuth Coverage Sectors will be derived from official government publications and entered in whole degrees.

Used On:	MLS and MLS Continuation records
Length:	3 characters
Character Type:	Numeric
Examples:	040, 062, 110

COMMENTARY

The Azimuth Coverage Sector includes the Proportional Guidance Sector and the Clearance Guidance Sector as illustrated in below.



5.173 Nominal Elevation Angle (NOM ELEV ANGLE)

Definition/Description: The "Nominal Elevation Angle" field defines the normal glide path angle for the MLS installation.

c-7 Source/Content: Glide Path angles from official government sources are entered into the field in tens of degrees, tenths of a degree and hundredths of a degree with the decimal point suppressed.

Used On:	MLS records
Length:	4 characters
Character Type:	Numeric
Examples:	1000, 0275

5.174 Restrictive Airspace Link Continuation (LC)

Definition/Description: The "Restrictive Airspace Link Continuation" field is used to indicate cases where it is not possible to store all Enroute Airway to Restrictive Airspace Links in the Flight Planning Continuation Record defined in 4.6.3 (more than four area links required).

Source/Content: When an additional Continuation Record (as defined in 4.6.4) is required to provide further Enroute Airway to Restrictive Airspace Links, this field will contain the alpha character "Y" to indicate that status.

Used On:	Enroute Airway Flight Planning Continuation records
Length:	1 character
Character Type:	Alpha

5.175 Holding Speed (HOLD SPEED)

Definition/Description: The "Holding Speed" will be the maximum speed in a holding pattern.

Source/Content: The speed limit will be derived from official government sources. If the value is different from the limit given with ICAO rules, it will be shown in knots, else the field will be blank.

Used On:	Holding Pattern record
Length:	3 characters
Character Type:	Numeric
Examples:	250, 015

5.176 Pad Dimensions

Definition/Description: The "Pad Dimensions" field defines the landing surface dimensions of the helicopter landing pad. The pad may be described as a rectangle or as a circle. c-8

Source/Content: Pad dimensions will be derived from official government sources and entered into the field in feet with a resolution of one foot. When the pad is rectangular, the first three digits define one side of the landing pad and the last three digits the other side of the pad, e.g. "060120" indicates the pad is 60 feet by 120 feet. When the pad is circular, the first three digits define the diameter of the pad and the last three digits c-10 will be zeros, e.g., "080000" indicates a pad that is 80 feet in diameter.

Used On:	Heliport record c-8
Length:	6 characters
Character Type:	Numeric
Examples:	060060, 100050, 040040

5.177 Public/Military Indicator (PUB/MIL)

Definition/Description: Airports can be classified into three categories, airports open to the general public, military airports, and airport closed to the public. This field permits these airports to be categorized by their use.

Source/Content: Airport data is obtained from official government sources and their use is defined in these civil and or military publications. Airports that are considered joint use, both civil and military, will be shown as a civil airport.

Field Content	Description
C	Airport/Heliport is open to the public (civil)
M	Airport/Heliport is military airport
P	Airport/Heliport is not open to the public (private)

Used On:	Airport and Heliport records
Length:	1 character
Character Type:	Alpha

5.178 Time Zone

Definition/Description: The standard time zone system is based on the division of world into 24 zones, each of 15 degrees longitude. The "zero" time zone is entered at
c-8 Greenwich meridian with longitudes 7 degrees, 30 minutes West and 7 degrees, 30 minutes east, and there is no difference in the standard time of this time zone and Greenwich Mean Time. Time zones are designated by letters of the alphabet by which the standard time of each zone differs from that at Greenwich.

Source/Content: Time zones will be derived from offical Time Zone Charts of the World. The first character of the field indicates the time zone observed by the airport. Time zones are indicated by a letter of the alphabet according to the following table:

Field Cont	Diff to Zulu time	Lat/long Boundaries	Field Cont	Diff to Zulu time	Lat/Long Boundaries
Z	0	W007 30/E007 30			
A	-1	E007 30/E022 30	N	+1	W007 30/W022 30
B	-2	E022 30/E037 30	O	+2	W022 30/W037 30
C	-3	E037 30/E052 30	P	+3	W037 30/W052 30
D	-4	E052 30/E067 30	Q	+4	W052 30/W067 30
E	-5	E067 30/E082 30	R	+5	W067 30/W082 30
F	-6	E082 30/E097 30	S	+6	W082 30/W097 30
G	-7	E097 30/E112 30	T	+7	W097 30/W112 30
H	-8	E112 30/E127 30	U	+8	W112 30/W127 30
I	-9	E127 30/E142 30	V	+9	W127 30/W142 30
K	-10	E142 30/E157 30	W	+10	W142 30/W157 30
L	-11	E157 30/E172 30	X	+11	W157 30/W172 30
M	-12	E172 30/180 00	Y	+12	W172 30/180 00

The second and third characters indicate, in minutes, that
c-10 the time observed by the airport/heliport must be adjusted from the hour by the number of minutes indicated.

Used On: Airport and Heliport records
Length: 3 characters
Character Type: Alpha/numeric
Examples: India falls in the "E" (-5) and "F" (-6) time zones, however, the time zone observed in all of India is "E30" (-5 hours and 30 minutes). For any country falling into the "M" or "Y" time zone and observing a time equal to the next greater time zone, the adjustment of 1 hour will be indicated by "60" in the second and third positions.

5.179 Daylight Time Indicator (DAY TIME)

Definition/Description: The "Daylight" Time Indicator" field is used to indicate if the airport observes Daylight or Summer time when such time changes are in effect for the country or state the airport resides in.

Source/Content: Countries and states that observe Daylight time will be obtained from official publications and the field will contain the alpha character "Y" if airport observes Daylight or Summer time. The field will contain the alpha character "N" if the airport does not observe Daylight time or if it is unknown.

Used On: Airport and Heliport records
Length: 1 character
Character Type: Alpha

5.180 Pad Identifier (PAD IDENT)

Definition/Description: The "PAD Identifier" field identifies the helipad described in the heliport records, helipad field, or that pad served by ILS/MLS described in the Airport and Heliport ILS/MLS records. There is a unique Heliport Record for each Helipad at a given location.

Source/Content: PAD Identifiers will be derived from c-14
official government publications when available. If not available from source, unique identifiers will be assigned by the data supplier.

Used On: Heliport, Airport and Heliport ILS and MLS Records
Length: Five characters
Character Type: Alpha/numeric
Examples: Source Supplied - PADA1, NWPAD, ALPHA, A1
Data Supplier - HELO1, HELO2, HELO3

5.181 H24 Indicator (H24)

Definition/Description: The "24H Indicator" field is used to indicate if the frequency is available on a 24 hour basis or only on a part time base.

Source/Content: Hours of operation are derived from official government publications. The field will contain the alpha character "Y" if the frequency is available 24
hours or the alpha character "N" if it is available part c-10
time.

Used On: Enroute/Airport Communications records.
Length: 1 character
Character Type: Alpha

5.182 Guard/Transmit (G/T)

Definition/Description: The "Guard/Transmit" field is used to indicate if the frequency shown in the Communication Frequency field is used, by the station, to receive voice communications or to transmit voice on.

Source/Content: The field will be derived from official government publications. The field will contain the alpha character "G" if the radio guards (receives), or the alpha character "T" if the radio transmits, on the respective frequency. The field will be blank if the radio receives and transmits on the same frequency.

Used On: Enroute/Airport Communications c-8
records.
Length: 1 characters
Character Type: Alpha

5.183 Sectorization (SECTOR)

Definition/Description: The "Sectorization" field is used to define the airspace sector a communication frequency is applicable for when an airport defines sectors by bearing from the same point.

Source/Content: Sectors are derived from official government publication. Each sector will contain two bearings, indicated in whole degrees, of the sector being defined. The first three numeric characters define the beginning bearing from the station, and the last three characters define the ending bearing from the station. If the sectors are not defined by bearings, then the sectorization will be shown in narrative form in an Airport Communications Continuation record.

Used On: Airport Communicatiuon records.
Length: 6 characters
Character Type: Alpha/numeric
c-8 Examples: 010189, 190009

5.184 Communication Altitude (COMM ALTITUDE)

Definition/Description: The "Communication Altitude" fields are used to define the altitude restrictions that the frequency is to be used within. On Airport Communications records, this field is normally used in conjunction with sectorization.

Source/Content: Altitude constraints will be derived from official government publications. The field may contain altitudes (all numerics) or flight levels (alpha/numerics). The all numeric fields will contain altitudes, in feet, with a resolution of one foot. The alpha/numeric fields will contain the alpha characters "FL" followed by the altitude in hundreds of feet. The first altitude field will contain an altitude when the Altitude Descript field contains a plus (+), minus (-) or B. The second altitude field will contain an altitude when the Altitude Descript field contains a B.

Used On: Enroute/Airport Communications records.
Length: 5 characters
Character Type: Alpha/numeric
Examples: 12000, 06000, FL050

5.185 Sector Facility (SEC FAC)

Definition/Description: The "Sector Facility" field is used to define the Navaid or Airport upon which the information in the "Sector" (5.183) field is based.

Source/Content: Sector related facility information will
c-10 be derived from official government sources. The field will contain the official Navaid or Airport identifier.

Used On: Airport and Heliport Communications Records
Length: 4 characters
Character Type: Alpha/numeric
Examples: IOC, COS, DEN, KJFK

5.186 Narrative

Definition/Description: The "Narrative" field is used to define communication sectors in a narrative form when the Sectorization field cannot be used, or to further define
c-8 the sector when the Sectorization field is used.

Source/Content: Sectors are derived from official government publications. The field will contain a free form description of the sectorization for the frequency being defined.

Used On: Airport Communications Continuation records
Length: 60 characters c-8
Character Type: Alpha/numeric
Examples: NORTH COMPLEX, RWYS 9/27 15/33

5.187 Distance Description (DIST DESC)

Definition/Description: The "Distance Description" field will designate whether a Communications frequency is to be used from the facility out to a specified distance or from a specified distance and beyond in the Airport Communications Record. In the VHF Navaid Limitation Continuation Record, the field is used to define whether the limitation applies from the navaid out to a specified distance or from a specified distance and beyond.

Source/Content: The field will contain the character "-" when the communications frequency or navaid limitation is "out to a specified distance." When the field content is "+", then the communications frequency is used or the navaid limitation applies "beyond" a specified distance.
When the field is blank, no restrictions/limitations apply. c-12

Used On: Airport Communications Records, VHF Navaid Limitation Continuation Records
Length: 1 character
Character Type: Alpha

5.188 Communications Distance (COMM DIST)

Definition/Description: The "Communications Distance" field is used to define the distance restriction a communication frequency is to be used within or beyond when such restrictions apply. This field is used in conjunction with the Distance Description field.

Source/Content: Distances restrictions are derived from official government publications and will contain a value in nautical miles from the communications facility. If the Distance Description field contains the character "-", then the frequency is to be used from the facility to the distance specified. If the Distance Description field contains the character "+" then the frequency is to be used from the distance specified and beyond. The field
will be blank if no restrictions apply. c-10

Used On: Airport Communications records.
Length: 2 characters
Character Type: Numeric
Examples: 05, 10, 15

5.189 Remote Site Name

Definition/Description: The "Remote Name" contains the name assigned to a Remote Communications Air/Ground and Remote Communications Outlet facilities. These remote facilities are unmanned air/ground communication stations with transmit and receive capability, used to
c-8 extend the service range of ARTCC and FSS stations.

Source/Content: Remote Names are derived from official government publications. The field may be blank if names are not assigned.

Used On:	Enroute Communications records.
Length:	25 characters
Character Type:	Alpha/numeric
Examples:	CHEYENNE, ABBEVILLE

5.190 FIR/RDO Identifier (FIR/RDO)

c-9

Definition/Description: The "FIR/RDO Identifier" field for Enroute Center records identifies the Flight Information Region or Upper Information Region. For FSS records the field identifies the Flight Service Station.

Source/Content: Identifiers are obtained from official government publications. For FIR/UIR the field will contain the four character FIR or UIR ident. For other record type the field will contain a three or four character identifier.

Used:	Enroute Communications records.
Length:	4 characters
Character Type:	Alpha/numeric
Examples:	KZDN, DEN

5.191 Triad Stations (TRIAD STA)

Deleted by Supplement 14.

5.192 Group Repetition Interval (GRI)

c-14

Deleted by Supplement 14.

5.193 Additional Secondary Phase Factor (ASF)

Deleted by Supplement 14.

5.194 Initial/Terminus Airport/Fix

Definition/Description: The "Initial Fix" and the
c-10 "Terminus Fix" fields are used to define the departure airport or initial fix and the destination airport or terminus fix of a preferred route.

Source/Content: For preferred and preferential routes these fields will normally contain an airport identifier. For North America Routes for North Atlantic Traffic - Common portion routes, these fields may contain NAVAID or waypoint identifiers. For North America routes for North Atlantic Traffic - Non-common portion routes, these fields may contain airport, NAVAID or waypoint identifiers. These fields will be entered on the first sequence of a route only, except when the route serves more than one airport, in which case the additional airports are shown on succeeding sequences.

Used On:	Preferred Route record
Length:	5 characters
Character Type:	Alpha/numeric

Examples: KDEN, CYUL, DEN, YUL, COLOR

Entries for Metro Area "New York to Atlanta"
Seq 010 KJFK K6 KATL K7
Seq 020 KLGA K6
Seq 030KEWR K6

Entries for Atlanta to Metro Area "New York"
Seq 010KATL K7 KJFK K6
Seq 020LGA K6
Seq 030KEWR K6

5.195 Time of Operation

Definition/Description: The "Time of Operation" field is used to indicate the times of operation of a Facility or Restriction.

Source/Content: The times of operation are derived from official government source. Each "Time of Operation" group contains the definition of a daily period of operations within a calendar week.

The first two positions identify days of the week, with Monday equal to 1 and Sunday equal to 7. A single day, for example, Monday, is depicted as "01". A consecutive series of days, for example Monday through Friday, is c-10 depicted as "15". Non-consecutive days require multiple Time of Operation entries. The remaining 8 characters define a starting time of four characters and an ending time of four characters. These times are in the format HHMM (H= hours, M= minutes) using a 24 hour time system. For example, 00012350 starts at one minute after midnight and ends at 10 minutes before midnight. 07152000 starts at 07:15 hours and ends at 20:00 hours.

Times of Operation can also be expressed in terms of Sunrise (SR) and Sunset (SS). When a "Time of Operation" is defined as starting at or ending at Sunrise, that time is specified as "000R". When a "Time of Operation" is defined as starting at or ending at Sunset, that time is specified as "000S". When a "Time of Operation" is defined as starting at or ending at a certain number of hours/minutes before or after Sunrise or Sunset, those times are specified as in the following examples:

030R for 30 minutes before Sunrise or R030 for 30 minutes after Sunrise.
100R for 1 hour before Sunrise or R100 for 1 hour after Sunrise.
030S for 30 minutes before Sunset or S030 for 30 minutes after Sunset.
100S for 1 hour before Sunset or S100 for 1 hour after Sunset

Of the three digits associated with "R" or "S," the first is an expression of hours, the second and third an expression of minutes. 1 hour, 30 minutes would be 130, 2 hours, 15 minutes would be 215, etc.

When multiple definitions are required to fully define the "Time of Operation" for a given calendar week, these are

5.0 NAVIGATION DATA - FIELD DEFINITIONS (cont'd)

coded as second and subsequent "Time of Operation" fields.

Examples:

A restriction valid on Mondays, Wednesdays and Fridays only, 0700 to 1700, would require three "Time of Operation" entries, one for 01 (Monday), one for 03 (Wednesday), one for 05 (Friday) and would be expressed as 0107001700 0307001700 0507001700.

c-10 A continuous restriction, starting on Monday at 0700 and ending on Friday at 1700 would require three "Time of Operation" entries, one for Monday of 0107002359, one for Tuesday through Thursday of 2400002359 and one for Friday of 0500001700.

When the times to be defined go over midnight, the second four characters of time information are valid on the actual ending day. For example, a "Time of Operation" of Monday through Friday, 1700 to 0300 actually ends on Saturday and would be shown as 1617000300, not 1517000300.

c-13 Used On: Enroute Airway Restriction Primary and the following Continuation Records - Airport/Heliport/Enroute Communications, Restrictive Airspace, Preferred Route, Enroute Airway Restrictions and Controlled Airspace.
c-10 Length: 10 characters
Character Type: Alpha/Numeric

5.196 Name Format Indicator (NAME IND)

Definition/Description: The "Name Format Indicator" field is used to describe the format of the "Waypoint Name/Description" field (5.43). This field will be formatted according to the rules described in Chapter 7 of this Specification, Waypoint Naming Conventions.

Source/Content: Values for this field have no official government source and are adjusted by input from the following table. Code may not be used in combination between columns.

Record 96	Column 97	Content 98	Description
A			Abeam Fix
B			Bearing and Distance Fix (c-14)
D			Airport Name as Fix
F			FIR Fix
H		NOTE 1	Phonetic Letter Name Fix
I			Airport Ident as Fix (c-14)
L			Latitude/Longitude Fix
M			Multiple Word Name Fix
N			Navaid Ident as Fix
P			Published Five - Letter - Name - Fix
Q			Published Name Fix, less than five letters
R			Published Name Fix, more than five letters
T			Airport/Rwy Related Fix (Note 2) (c-10)
U			UIR Fix
	O		Localizer Marker with officially published five - letter identifier
	M		Localizer Marker without officially published five - letter identifier

Note 1: Column 98 is reserved for future expansion of the Name-Format-Indicator concept.

Note 2: The "T" indicator will be used with all fixes established in accordance with Chapter 7, Section 7.2.6, Terminal Waypoints, in this document. c-14

Used On: Enroute Waypoints, Airport and Heliport Terminal Waypoints
Length: 3 characters
Character Type: Alpha

5.197 Datum Code (DATUM)

Definition/Description: The "Datum Code" field defines the Local Horizontal Reference Datum to which a geographical position, expressed in latitude and longitude, is associated. c-10

Source/Content: Local Horizontal Reference Datums will be derived from official government documentation. The "Datum Code" field will contain a three letter code corresponding to that government publication. A listing of valid three letter codes is contained in Attachment 2 to this Specification.

Used On: VHF Navaid, NDB Navaid, Terminal NDB, Enroute Waypoint, Airport, Fan Marker, Heliport and GLS Transmitter Records c-14
Length: 3 characters
Character Type: Alpha
Examples: AGD, NAS, WGA

5.198 Modulation (MODULN)

Definition/Description: The "Modulation" field will design the type of modulation for the frequency in the "Communication Frequency" (5.103) field. c-10

Source/Content: The field contains the following information:

Field Content	Description
A	Amplitude Modulated frequency
F	Frequency Modulated frequency

Used On: Enroute, Airport and Heliport Communication Records
Length: 1 character
Character Type: Alpha

5.199 Signal Emission (SIG EM)

Definition/Description: High Frequency (HF) signals used in aeronautical communications can be the complete signal or a portion of the signal, called a sideband. The "Signal Emission" field will designate for each HF Frequency what emission is used.

Source/Content: This field contains the following information:

Note: The field is blank on records with frequencies that are not HF, see Section 5.104.

Field Content	Description
3	Double Sideband (A3)
A	Single sideband, reduced carrier (A3A)
B	Two Independent sidebands (A3B)
H	Single sideband, full carrier (A3H)
J	Single sideband, suppressed carrier (A3J)
L	Lower (single) sideband, carrier unknown
U	Upper (single) sideband, carrier unknown

Used On: Enroute, Airport and Heliport Communications Records
c-10 Length: 1 character
Character Type: Alpha/Numeric

5.200 Remote Facility (REM FAC)

Definition/Description: The "Remote Facility" field is used to define the Navaid that a Remote Communications Outlet (RCO) will be transmitting through.

Source/Content: Navaids used as RCOs will be derived from official government publications and the field will contain the official 2,3 or 4 character Navaid Identifier.

Used On: Enroute, Airport and Heliport Communications Records.
Length: 4 characters
Character Type: Alpha/Numeric

5.201 Restriction Record Type (REST TYPE)

Definition/Description: The "Restriction Record Type" field is used to define what type of a restriction is contained in the Enroute Airway Restriction Record in question.

Source/Content: The content of this field should be selected from the following listing of possible codes:

AE = Altitude Exclusion. The record contains altitudes, normally available, that are excluded from use for the Enroute Airway Segment. May be further restricted by "Time of Operation" information.

TC = Cruising Table Replacement. The record contains only a reference to a Cruising Table Identifier. That Cruise Table will be in force, replacing the Cruise Table Identifier in the Enroute Airway segment records defined in the "Start Fix/End Fix" fields.

SC = Seasonal Restriction. Record is used to close an Airway or portion of an Airway on a seasonal basis.

NR = Note Restrictions. The record contains restrictions that do not fit the pattern of "formatted" information allowed by other "Restriction Record Types".

Used On: Enroute Airway Restriction Records
Length: 2 characters
Character Type: Alpha

5.202 Exclusion Indicator (EXC IND)

Definition/Description: The "Exclusion Indicator" field is an indication of how the altitudes contained in the Cruising Table record referenced by the Airway segment(s) are restricted. This is an "all altitude" restriction, further defined by direction of flight. These codes will not be used when certain altitudes remain available in a direction of flight.

Source/Content: The content of the field will be one of the codes from the following listing:

"A" = All altitudes in both directions of flight are restricted. This effectively closes the airway in both direction of flight. c-10

"B" = All altitudes in the opposite direction in which the Enroute Airway is coded are restricted. This effectively closes the airway in one direction of flight i.e., the opposite direction from that in which the airway is coded.

"F" = All altitudes in the direction in which the Enroute Airway is coded are restricted. This effectively closes the airway in one direction of flight i.e., the direction in which the airway is coded.

(blank) = The restriction is not an "all altitude" restriction.

Used On: Enroute Airway Restriction Records
Length: 1 character
Character Type: Alpha

5.203 Block Indicator (BLOCK IND)

Definition/Description: The "Block Indicator" field is used to specify that the altitudes that follow in the restriction record are either "block" of altitudes that are restricted (not available for flight) or are individual altitudes that are restricted.

Source/Content: The field will either be set to "B" indicating an altitude block or "I" indicating individual altitudes. One or the other or both codes will appear in restriction records that are not "Exclusive" restrictions (see Section 5.201).

Used On: Enroute Airway Restriction, Enroute Airway Restriction Continuation Records
Length: 1 character
Character Type: Alpha
Examples: (using multiple columns of the record)

c-10

030B090 = all altitudes from 3000 feet to 9000 feet (inclusive) are not available.
030I090 = the individual altitudes of 3000 feet and 9000 feet are not available.
030I070B130 =

5.204 ARC Radius (ARC RAD)

Definition/Description: The "ARC Radius" field is used to define the radius of a precision arc in the "Constant Radius To A Fix" Path and Termination, the "RF" Leg.

Source/Content: The content of the field will be derived from official source publications. It will be expressed in nautical miles, tenths, hundredths and thousandths of a nautical mile, with the decimal point suppressed. A conversion to feet of the resolution in nautical miles is equal to an accuracy of 6 feet.

Used On: SID, STAR and Approach Records
Length: 6 characters
Character Type: Numeric
Examples: 246868, 460820, 691231

5.205 Navaid Limitation Code (NLC)

Definition/Description: The "Navaid Limitation Codes" field is used to define the type of limitation to be expected with a VHF Navaid.

c-11 Source/Content: The type of limitation will be derived from official government publications and entered using one of the codes defined in the table.

Content	Limitation Description
C	Coverage, the limitations are expressed as maximum reception reliability
F	Fluctuations, radial(s) are affected by course fluctuations.
G	Roughness, signal roughness experienced in the sector(s) defined.
N	Unreliable in the sector(s), at the altitude(s), at the distance(s) defined.
R	Restricted in the sector(s), at the altitude(s), at the distance(s) defined.
T	Unusable in the sector(s), at the altitude(s), at the distance(s) defined.
U	Out of Tolerance in the sector(s), at the altitude(s), at the distance(s) defined.

Used On: VHF Navaid Limitation Continuation Records
Length: 1 character
Character Type: Alpha

5.206 Component Affected Indicator (COMP AFFTD IND)

Definition/Description: The VHF Navaid File contains navaids that have one or two components - azimuth and/or distance. Published limitations may apply to one or both of the components. The "Component Affected Indicator" defines which component(s) are affected by the limitation.

the individual altitude of 3000 feet and all altitudes from 7000 f

Source/Content: The field content will be entered as indicated in the table based on official government publications. When different limitations apply to different components or components pairs, this will result in multiple Component Affected Indicators for a single navaid to cover the complete limitation. In these cases, the Sequence Number (Section 5.12) will start again with one (01) with each new Component Affected Indicator.

Content	Component Description
A	TACAN or VORTAC, TACAN azimuth component only affected.
B	VORDME, or VORTAC, both azimuth and distance component affected.
D	VORDME or DME, distance component only affected.
M	VORTAC or TACAN, TACAN azimuth and distance component affected.
T	TACAN or VORTAC, distance component affected.
V	VOR, VORDME or VORDME, VOR azimuth component affected.
Z	VORDME, VORTAC or TACAN, VOR and TACAN azimuth and distance component affected.

c-12

Used On: VHF Navaid Limitation Continuation Records
Length: 1 character
Character Type: Alpha

5.207 Sector From/Sector To (SECTR)

Definition/Description: The "Sector From/Sector To" field defines sectorization applicable to the range limited sectors of VOR/DME, VORTAC or TACAN facilities, using the sector letters from the table. Each sector is described by two characters and is to be interpreted as "from" the first character, clockwise "to" the second character.

Source/Content: Field content is derived through interpretation of official government publication information which may be in a variety of formats.

5.0 NAVIGATION DATA - FIELD DEFINITIONS (cont'd)

5.207 Sector From/Sector To (Sectr) (cont'd)

Sector Character	From (degrees true)	To (degrees true)
A	000	015
B	015	030
C	030	045
D	045	060
E	060	075
F	075	090
G	090	105
H	105	120
I	120	135
J	135	150
K	150	165
L	165	180
M	180	195
N	195	210
O	210	225
P	225	240
Q	240	255
R	255	270
S	270	285
T	285	300
U	300	315
V	315	330
W	330	345
X	345	000

c-12

Used On: VHF Navaid Limitation Continuation Records
Length: 2 characters
Character Type: Alpha
Examples: AB, TA, LW

5.208 Distance Limitation (DIST LIMIT)

Definition/Description: The "Distance Limitation" field is used to define the distance(s) from the navaid at which the limitation applies.

Source/Content: "Distance Limitations" are derived from official government publications. The field will contain one or two distances expressed in nautical miles from the facility. Used together with the "Distance Description" field, the distances can be provided as indicated in the table of examples. The field will be blank if there are no distances associated with the limitation.

Used On: VHF Navaid Limitation Continuation Records
Length: 6 characters
Character Type: Alpha/Numeric
Examples:

Distance Description	Distance Limit – First Three Digits	Ditance Limit – Second Three Digits	Description of Content
–	040	000	Limitation valid out to 40NM from the facility.
+	040	000	Limitation valid beyond 40NM from the facility.
B	100	040	Limitation valid between 40NM and 100NM.
Blank	040	000	Limitation valid at 40NM from the facility.

5.209 Altitude Limitation (ALT LIMIT)

Definition/Description: The "Altitude Limitation" field is used to define the altitude(s) at which the limitation applies.

Source/Content: "Altitude Limitations" are derived from official government publications. The field will contain one to two altitudes, expressed in hundreds of feet MSL. Used together with the "Altitude Description" field, the altitudes can be provided as indicated in the table of examples. The field will be blank if there are no altitudes associated with the limitation.

Used On: VHF Navaid Limitation Continuation Records c-12
Length: 6 characters
Character Type: Alpha/Numeric
Examples:

Altitude Description	Altitude Limit - First Three Digits	Altitude Limit - Second Three Digits	Description of Content
-	040	000	Limitation valid at or below 4000'/FL040.
+	040	000	Limitation valid at or above 4000'/Fl040.
B	100	040	Limitation valid from 4000'/FL040 to 10000'/FL100.
blank	040	000	Limitation valid at 4000'/FL040.

5.210 Sequence End Indicator (SEQ END)

Definition/Description: The "Sequence End Indicator" field is used to define the end of a set of sequences defining a given limitation to a given VHF Navaid Component or Component pair.

c-12 Source/Content: "Limitations" are derived from official government publications. The field will contain the character "E" in that sequence which is the end of a given limitation.

Used On:	VHF Navaid Limitation Continuation Records
Length:	1 character
Character Type:	Alpha

c-13
5.211 Required Navigation Performance (RNP)

Definition/Description: Required Navigation
c-14 Performance (RNP) is a statement of the Navigation Performance necessary for operation within a defined airspace in accordance with ICAO Annex 15 and/or State published rules.

Source/Content: RNP values derived from official government source will be used when available. They are entered into the field in nautical miles (two digits) with a zero or negative exponent (one digit). The content can be:

When used on Enroute Airway segments, RNP shall apply to the subsequent segments of the airway when viewed in order of increasing sequence numbers. A value of RNP on an Enroute Airway segment may be superseded by another value of RNP on a sequentially greater segment.

When used on a SID, STAR, Approach Transition or Missed Approach record, the RNP shall apply to the balance of the procedure route unless superseded by another value of RNP on a subsequent record.

When used on final approach records, RNP shall apply to the waypoint referenced by the final approach record.

Note 1: The RNP concept will also be applied to defined airspaces as well as specific flight
c-13 paths. ARINC 424-13 addresses an "airspace record" that includes a reservation for RNP until actual content can be defined.

COMMENTARY

This material is considered preliminary. Provisions for Vertical RNP values have been intentionally omitted pending further definition by RTCA SC-181/EUROCAE WG-13.

Used On:	Enroute Airways, SID, STAR and Approach Route and Controlled Airspace Records
Length:	3 characters
Character Type:	Numeric
Examples:	990 (equal to "99.0NM"), 120 (equal to "12.0NM"), 013 (equal to "0.001NM")

5.212 Runway Gradient (RWY GRAD)

Definition/Description: The Runway Gradient field indicates an overall gradient in percent, measured from the start of take-off roll end of the runway designated in the record. The gradient is expressed as a positive or negative gradient; positive being an upward and negative being a downward gradient.

Source/Content: The values will be derived from official government source. The first position will be either a "+" or a "-" sign indicating upward or downward gradient. Positions 2 through 5 indicate the gradient with the decimal point suppressed. The Maximum Gradient that can be expressed in this field is +9.000 or -9.000

Used On:	Runway Records
Length:	5 characters
Character Type:	Alpha/Numeric
Examples:	+0450, -0300

5.213 Controlled Airspace Type (ARSP TYPE)

Definition/Description: The "Controlled Airspace Type" field is used to indicate the type of controlled airspace, using codes from the table below.

Source/Content : The airspace type should be derived from official government publications. The table below shows the indicators used for the various types. For the c-13
USA, the previous applied designations such as TCA are supplied for ease of reference, they are longer officially published.

Field Content	Description
A	Class C Airspace (Was ARSA within the USA).
C	Control Area, ICAO Designation (CTA).
M	Terminal Control Area, ICAO Designation (TMA or TCA).
R	Radar Zone or Radar Area (Was TRSA within the USA).
T	Class B Airspace (Was TCA with the USA).
Z	Class D Airspace within the USA, Control Zone, ICAO Designation (CTR).

Used On:	Controlled Airspace Records
Length:	1 character
Character Type:	Alpha

5.214 Controlled Airspace Center (ARSP CNTR)

Definition/Description: The "Controlled Airspace Center" field is used to define the navigation element upon which the controlled airspace being defined is predicated, but not necessarily centered. Where the Airspace is not defined then the "Region Identifier" should be used. In this case, the Controlled Airspace Center will contain the ICAO Identification code for the Controlled Airspace to which the data contained in the record relates.

Source/Content : The Controlled Airspace Center will be determined during the construction of the records. As an example the New York Class B Airspace (formerly TCA) is centered on the JFK VOR, the LGA VOR and the Newark

5.214 Controlled Airspace Center (ARSP CNTR) (cont'd)

airport. The Controlled Airspace Center field could contain the Kennedy Airport identifier "KJFK" as the key for all records describing the New York Class B Airspace. The field may contain a Navaid, Enroute Waypoint or Airport Identifier. A "Region Identifier" content should be derived from official government source where the controlling authority is published or from ICAO Document 7910, Location Indicators. In cases where no official identifier is published that can be used as the "Airspace Center" where the controlled airspace is used for more than one airport, the Region Identifier can be used.

COMMENTARY

It should be noted that during construction of a Controlled Airspace Center, no published Navaid, Enroute Waypoint, Airport Identifier or Region Identifier may be found to be suitable. Data suppliers may create a "center waypoint" for use in the "Airspace Center" field in such cases.

Used On: Controlled Airspace records
Length: 5 characters
Character Type: Alpha/numeric
Examples: OTR, FISHS, KJFK, EGTT

5.215 Controlled Airspace Classification (ARSP CLASS)

Definition/Description: The "Controlled Airspace Classification" field will contain an alpha character indicating the published classification of the controlled airspace, when assigned.

c-13 Source/Content : Classification codes will be derived from official government sources. If source does not provide a classification, the field will be blank.

Used On: Controlled Airspace records
Length: 1 character
Character Type: Alpha
Examples: A through G

5.216 Controlled Airspace Name (ARSP NAME)

Definition/Description: The "Controlled Airspace Name" field will contain the name of the controlled airspace when assigned.

Source/Content : Names will be derived from official government sources. The name, if assigned, will be entered in the first record only. If source does not assign a name, the field may be blank.

Used On: Controlled Airspace records
Length: 30 characters
Character Type: Alpha/numeric
Examples: DENVER CLASS B, OAKLAND OCTA

5.217 Controlled Airspace Indicator (CTLD ARSP IND)

Definition/Description: The "Controlled Airspace Indicator" field is used to indicate if an airport is associated with controlled airspace of a terminal type such as a Terminal Control Area (TMA or TCA) Radar Area or Class B or C Airspace within the USA.

Source/Content: Airports lying within or below terminal controlled airspace will be determined through the use of official government publications describing the lateral limits of such airspace. The Controlled Airspace Airport/ICAO fields identify the airport for which terminal controlled airspace has been included in the Controlled Airspace Section of the file. The Controlled Airspace Indicator field will contain one of the codes from the table below. If an airport is not associated with any terminal controlled airspace of the types in this table, the Controlled Airspace Indicator field will be blank. The Controlled Airspace Airport/ICAO may be identical to or different than the record airport. Although Control Zones (CTR) are provided as Controlled Airspace, no reference to them is made in this manner in the Airport Flight Planning Continuation Record.

Field Content	Description
A	The Airport is within or below the lateral limits of Class C Airspace.
C	The Airport is within or below the lateral limits of a CTA.
M	The Airport is within or below the lateral limits of a TMA or TCA.
R	The Airport is within or below the lateral limits Radar Zone.
T	The Airport is within or below the lateral limits of Class B Airspace.

Used On: Airport Flight Planning Continuation Records
Length: 1 character
Character Type: Alpha

5.218 Geographical Reference Table Identifier (GEO REF TBL ID) c-13

Definition/Description: The "Geographical Reference Table Identifier" will be used to provide a unique identification for each Geographical Entity. As the "Geographical Entity" field is a large field with no established content, this two character code will act as a pseudo key for the record.

Source/Content: The content of this field will be determined by the data supplier using the rules below.

Position One - The first letter or other significant letter of the Geographical Entity.
Position Two - A numeric of 0 thru 9 for each multiple of the character in position one.

Used On: Geographical Reference Table records
Length: 2
Character Type: Alpha/numeric
Examples: Scandinavia S1
Southern United Kingdom S2
Baleric Islands B0

5.219 Geographical Entity (GEO ENT)

Definition/Description: The Geographical Reference Table will be used to identify "Geographical Entities" not definable by other established encoding systems. For established systems refer to Section 7 of this document.

Source/Content: The content of the field will be derived from official government source documentation for preferred route systems of any kind.

Used On: Geographical Reference Table Records
Length: 29 characters
Character Type: Alpha/numeric

5.220 Preferred Route Use Indicator (ET IND)

Definition/Description: The "Preferred Route Use Indicator" provides information on whether the route in question is point-to-point and therefore usable for navigation, or area-to-area and usable only as advisory information which requires further processing. The field will also provide information on whether or not RNAV equipment is required to use the route.

Source/Content: The content of this field will be determined by the data supplier at the time the route is established. The two character field will be used to denote both the definition of the route initial/terminus nature and the RNAV equipment requirement. In position one, the field will contain the alpha character "P" if the route is point-to-point or "A" if the route is area-to-area. In position two, the field will contain the alpha character "R" if RNAV equipment is required and the alpha character "N" if RNAV equipment is not required.

Used On: Preferred Route and Geographical Reference Table Records
Length: 2 characters
c-13 Character Type: Alpha

5.221 Aircraft Use Group (ACFT USE GP)

Definition/Description: The "Aircraft Use Group" field provides information on what aircraft or groups of aircraft are permitted to use a certain route.

Source/Content: The raw information for this field will be derived from government sources and encoded according to the table below. The first column will contain the code valid for the routing. See Note One for the second column content.

Aircraft or Aircraft Group	Field Content	Field Content
All Aircraft	A	
All Aircraft, Cruise speed 250 kts or less	C	
Non-Jet and Turbo Prop	D	
Multi-Engine Props Only	E	
Jets and Turbo Props/Special, Cruise Speed 190 kts or greater	F	
Helicopter Only	H	
Jet Power	J	See Note 1
Turbo-Prop/Special, Cruise Speed 190 kts or greater	M	
Non-Jet, Non-Turbo Prop	N	
Non-Jet, Cruise speed 190 kts or greater	P	
Non-Jet, Cruise speed 189 kts or less	Q	
Aircraft as defined in a Notes Continuation Record	R	
Single Engine	S	
Twin Engine	T	

Note 1: When two routings have been defined between end fixes/areas for the sole purpose of separating aircraft groups of use, the first column will contain the code for the group that may use the routing and the second column will contain the code for the group that must use the alternative routing. If there is no alternative routing for aircraft group separation, the second column will be blank.

Used On: Preferred Route Records c-13
Length: 2 characters
Character Type: Alpha
Examples: For a pair of routings established for aircraft group separation between Single Engine and Twin Engine, the Single Engine would carry the code of ST and the Twin Engine Route would be TS.

5.222 GPS/FMS Indicator (GPS/FMS IND)

Definition/Description: The "GPS/FMS Indicator" field provides an indication of whether or not the responsible government agency has authorized the overlay of a conventional, ground-based aid approach procedure with the use of a GPS sensor or if the procedure may be flown with FMS as the primary navigation equipment.

Source/Content: The Indicator will be selected from the table below. c-14

Indicator Definition	Field Content
Procedure Not Authorized for GPS or FMS Overlay	0
Procedure Authorized for GPS Overlay, primary Navaids operating and monitored	1
Procedure Authorized for GPS Overlay, primary Navaids installed, not monitored	2
Procedure Authorized for GPS Overlay, Procedure Title includes "GPS"	3
Procedure Authorized for FMS Overlay	4
Procedure Authorized for FMS and GPS Overlay	5
Procedure Overlay Authorization unspecified	U

Used On: Airport and Heliport Approach Procedure Records
Length: One character
Character Type: Alpha/Numeric

5.0 NAVIGATION DATA – FIELD DEFINTIONS (cont'd)

5.223 Operations Type (OPS TYPE)

Definition/Description: The "Operations Type" field contains information on parameters such as "approach procedure," or "advanced operations" or others still to be defined. Advanced operations can be straight-in approaches followed by a precision missed approach, a precision curved approach or departure procedure, etc.

Source/Content: A code derived from government source documentation.

Used On: Path Point Records
Length: 2 Characters
Character Type: Alpha/numeric
Examples: Content TBD, Default Blank

5.224 Approach Indicator (APP IND)

Definition/Description: The "Approach Indicator" field is a single alphanumeric character used to differentiate between multiple RNAV - GPS/GLS final approach paths to the same runway. The first such procedure is labeled "0," additional approaches are incrementally numbered.

Source/Content: A code of "0" through "9" or "A" through "Z," excluding "I" and "O," based on government source documentation.

c-14 Note: This single character is consistent with the "Multiple Approach Indicator" included as the fifth character of an Approach Procedure Identifier.

Used On: Path Point Records
Length: One Character
Character Type: Alpha/Numeric

5.225 Ellipsoidal Height

Definition/Description: The "Ellipsoidal Height" field is the height of a surveyed point in reference to the WGS-84 ellipsoid.

Source/Content: The Ellipsoidal Height will be derived from official government source and entered with a resolution of one foot or one meter. When the height is below the ellipsoid, the first position will carry a minus (-) sign, otherwise this position will be a plus (+) sign.

Used On: Path Point Records
Length: 6 Characters
Character Type: Alpha/numeric
Examples: +00356, +00051, +015 -00022, -01566

5.226 Glide Path Angle (GPA)

Definition/Description: The "Glide Path Angle" field is an angle, expressed in degrees, tenths and hundredths of degrees, measured at the Flight Path Control Point (FPCP) of a RNAV - GPS/GLS Approach Procedure that establishes the intended descent gradient for the final approach flight path.

Source/Content: The values will be derived from official government source.

Used On: Path Point Records
Length: 4 Characters
Character Type: Numeric
Examples: 0275 (is equal to 2.75°), 1015 (is equal to 10.15°), 0300 (is equal to 3.00°)

5.227 Orthometric Height (ORTH HGT)

Definition/Description: The "Orthometric Height" field is the height of a surveyed point in reference to Mean Sea Level (MSL).

Source/Content: The Orthometric Height will be derived from official government source and entered with a resolution of one foot or one meter. When the height is below MSL, the first position will carry a minus (-) sign, otherwise this position will be a plus (+) sign.

Used On: Path Point Records
Length: 6 Characters
Character Type: Alpha/numeric
Examples: +00356, +00051, +01566, -00022, -01566

5.228 Unit of Height (UNIT)

Definition/Description: The "Unit of Height" field is used in Path Point Records for ellipsoidal and orthometric heights. These heights may be provided in government publications in either feet or meters. As these height fields are included in the "CRC Wrap," meter values cannot be converted to feet as they would be in other places in ARINC 424 File preparation. c-14

Source/Content: The field will contain the character "F" if the height values were provided in source documentation in feet or the character "M" if those heights were provided in meters.

Used On: Path Point Records
Length: One character
Character Type: Alpha

5.229 Path Point Data CRC (CRC)

Definition/Description: The "Path Point Data CRC" field is an eight (8) character hexadecimal representation of the 32-bit CRC value provided by the source for the information contained in the aeronautical data fields being monitored for integrity. The value is calculated by a specific mathematical algorithm, which is both machine and man processible.

Source/Content: The CRC calculation information is available as Chapter Six of this Specification.

Used On: Path Point Records
Length: Eight Characters
Character Type: Alpha/numeric
Examples: 243BC649, A6934B72

5.230 Procedure Type (PROC TYPE)

Definition/Description: The "Procedure Type" field used on Flight Planning Arrival/Departure Data Record is a single character code indication the type of procedure in the record, such as Arrival, Standard Instrument Arrival Route, Approach.

5.0 NAVIGATION DATA – FIELD DEFINTIONS (cont'd)

Source/Content: The Procedure Type code must be one of the following codes:

Procedure Type Description	Procedure Type Code
Arrival Procedure, Available in Database	A
Arrival Procedure, Not Available in Database	B
Departure Procedure, Available in Database	C
Departure Procedure, Not Available in Database	D
Standard Terminal Arrival Route (STAR), Available in Database	E
Standard Terminal Arrival Route (STAR), Not Available in Database	F
Standard Instrument Departure (SID), Available in Database	G
Standard Instrument Departure (SID), Not Available in Database	H
Vector SID, Available in Database	I
Vector SID, Not Available in Database	J
Approach Procedure, Available in Database	K
Approach Procedure, Not Available in Database	L

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Used On: Flight Planning Arrival/Departure Data records
Length: One character
Character Type: Alpha

5.231 Along Track Distance (ATD)

Definition/Description: The "Along Track Distance" field used on Flight Planning Arrival/Departure Data Records is the total distance for a given transition, from the initial fix to the ending fix in the transition. A single occurrence of a Flight Planning Arrival/Departure Data record can contain up to three Along Track Distance fields, one for each of the transition types that can make up a single terminal route in the Primary Record and up to four possible intermediate fix points in each Continuation Record. Collectively, the values equal the along track distance from the first fix in the first transition to the last fix in the last transition.

Source/Content: The along track distances will be calculated by data suppliers using coded terminal procedures or uncoded terminal procedures derived from official government source and expressed in nautical miles with a 1NM resolution.

Used On: Flight Planning Arrival /Departure Data records
Length: 3 characters
Character Type: Numeric

5.232 Number of Engines Restriction (NOE)

Definition/Description: The "Number of Engines Restriction" field used on Flight Planning Arrival/Departure Data Records is derived from government source and is included whenever a given procedure, normally departure, is restricted to, or designed for, aircraft with a specific number of engines.

Source/Content: The number of engines will be taken from official government source. The field will contain the character Y for each engine configuration position, 1, 2, 3 and 4, for which the procedure is authorized. Non-authorized configuration positions will contain the character N.

Used On: Flight Planning Arrival /Departure Data records
Length: 4 characters
Character Type: Alpha
Examples: YYYY (1, 2 3 or 4 Engine aircraft may use procedure)
NNYY (3 and 4 Engine aircraft may use procedure)

5.233 Turboprop/Jet Indicator (TURBO)

Definition/Description: The "Turboprop/Jet Indicator" field used on Flight Planning Arrival/Departure Data Records is derived from government source and is included whenever a given procedure, normally departure, is restricted to, or designed for, aircraft with a specific kind of engines.

Source/Content: The indication of Turboprop, Jet or Both on the use restriction of given procedure will be taken from official government source. The field will c-14
indicate the use restriction with a character from the table below.

Aircraft or Aircraft Group	Field Content
All Aircraft	A
Jets and Turbo Props	B
All Aircraft, Cruise speed 250 kts or less	C
Non-jet and Turbo Prop	D
Multi-Engine Props Only	E
Jets	J
Non-Jet, Non-Turbo Prop	N
Turbo Props	P

Used On: Flight Planning Arrival /Departure Data Records
Length: One character
Character Type: Alpha

5.234 RNAV Flag (RNAV)

Definition/Description: The "RNAV Flag" field used on Flight Planning Arrival/Departure Data Records is derived from government source and is included whenever a given procedure included in the record is restricted to, or designed for, aircraft capable of flying RNAV Procedures.

Source/Content: The indication of RNAV, Yes or No, on a given procedure will be taken from official government source. The field will indicate Y for "Yes," the procedure is an RNAV procedure or N for "No," the procedure is not RNAV.

Used On: Flight Planning Arrival /Departure Data records
Length: One character
Character Type: Alpha

5.235 ATC Weight Category (ATC WC)

Definition/Description: The "ATC Weight Category" field used on Flight Planning Arrival/Departure Data Records is derived from government source and is included whenever a given procedure included in the record is restricted to, or designed for, a specific aircraft weight grouping.

Source/Content: The indication of Heavy, Medium or Light aircraft on a given procedure will be taken from official government source. The field will be derived from that source to indicate:

H for Heavy, all aircraft types of 136,000kg (300000LB) or more.

M for Medium, aircraft types less than 136,000kg (300,000LB) and more than 7,000kg (155,000LB).

L for Light, aircraft types of 7,000kg (155,000LB) or less.

Used On: Flight Planning Arrival /Departure Data records
Length: One character
Character Type: Alpha

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5.236 ATC Identifier (ATC ID)

Definition/Description: The "ATC Identifier" field used on Flight Planning Arrival/Departure Data Records is the indication of the officially published procedure designation which is required for Flight Planning.

Source/Content: The ATC Identifier will be derived from official government source. This seven character field is required in addition to the six character identifier, the former is used in Flight Planning, the latter in accessing the database.

Used On: Flight Planning Arrival /Departure Data records
Length: 7 characters
Character Type: Alpha/numeric

5.237 Procedure Description (PROC DESC)

Definition/Description: The "Procedure Description" field used on Flight Planning Arrival/Departure Data Records is the textual representation of the procedure name.

Source/Content: The Procedure Description will be derived from official government source. It will assist in matching flight plan content to charted procedures.

Used On: Flight Planning Arrival /Departure Data records
Length: 15 characters
Character Type: Alpha/numeric

5.238 Leg Type Code (LTC)

Definition/Description: The "Leg Type Code" field used on Flight Planning Arrival/Departure Data Records is a simplification of the Path Terminator concept. It will provide the information on the path between intermediate waypoints as straight or curved and provide an indication of the change in direction of flight, expressed as left or right, at an intermediate waypoint.

Source/Content: The Leg Type Code will be derived from official government source. In this two character field, the first position will indicate with the character S, straight line point to point and with the character C, curved line flight track. The second position will be used as a turn indication, L for Left and R for Right when there is a turn requirement at an intermediate waypoint.

Used On: Flight Planning Arrival /Departure Data records
Length: 2 characters
Character Type: Alpha

5.239 Reporting Code (RPT)

Definition/Description: The "Reporting Code" field used on Flight Planning Arrival/Departure Data Records is a simplification of the Waypoint Description concept. It will provide the information on intermediate waypoints as either Position Report Required (Compulsory Report) or Position Report Not Required (On-Request Report).

Source/Content: The Reporting Code will be derived from official government source. In this single character field, the code "C" will indicate Position Report Required and the code "X" Position Report Not Required. c-14

Used On: Flight Planning Arrival /Departure Data records
Length: One character
Character Type: Alpha

5.240 Altitude (ALT)

Definition/Description: The "Altitude" field used on Flight Planning Arrival/Departure Data Records is a simplification of the altitude concept used in the full procedure records. It will provide an altitude indication in hundreds of feet, no AGL, MSL, FL etc indication provided.

Source/Content: The Altitude will be derived from official government source and reduced to this flight planning resolution requirement.

Used On: Flight Planning Arrival /Departure Data records
Length: 3 character
Character Type: Numeric
Examples: FL100 = 100
10000 feet = 100
03500 feet = 035

5.241 Fix Related Transition Code (FRT Code)

Definition/Description: The "Fix Related Transition Code" is used on Flight Planning Arrival/Departure Data Continuation Records containing Intermediate Fix information and provides an indication, through use of the standard coding practices of separating the procedure into transitions, as to where in the procedure the intermediate fix is located.

Source/Content: The field will contain a code an meaning as indicated in the table below.

Intermediate Fix is Located in Transition Type	Field Content
Fix Located in SID Runway Transition	1
Fix Located in SID Common Portion	2
Fix Located in SID Enroute Transition	3
Fix Located in STAR Enroute Transition	4
Fix Located in STAR Common Portion	5
Fix Located in STAR Runway Transition	6

Used On: Flight Planning Arrival/Departure Data records
Length: One character
Character Type: Numeric

5.242 Procedure Category (PROC CAT)

c-14 Definition/Description: The Airport and Heliport SID/STAR/Approach Procedure Route Type supports the "All Sensor RNAV" Approach procedure. This kind of approach will have multiple sets of weather minimums (DH and NDA) associated with it. This field identifies the Procedure Categories for which these minimums apply.

Source Content: The field will contain a coded category from the following table:

Content	Procedure Category
LAAS	Local Area Differential Augmentation System
WAAS	Wide Area Differential Augmentation System
FMS	Flight Management System
GPS	Global Positioning System, no Augmentation
VDME	VORDME, VORTAC
CIRC	Circle-To-Land

Used On: Airport and Heliport SID/STAR/Approach Procedure Continuation Records
Length: 4 characters
Character Type: Alpha

5.243 GLS Station Identifier

Definition/Description: The "GLS Identifier" field defines the identification code for retrieval of such a transmitter from a database. This is not a transmitted identifier.

Source/Content: The content of this field will be the Airport or Heliport ICAO Location Identifier Code at which the transmitter is installed.

Used On: GLS Records
Length: 4 characters max
Character Type: Alpha/numeric

5.244 GLS Channel

Definition/Description: The "GLS Channel" field identifies the channel that will be decoded to identify the frequency of the differential GLS ground station and the approach information that will be sent by the differential GLS ground station.

Source/Content: The values for this field will be derived from official government sources and entered a five character channel identification code. The range is 20000 to 99999.

Used On: GLS Records
Length: 5 character
Character Type: Numeric
Examples: 20010, 56234

5.245 Service Volume Radius

Description/Definition: The service volume radius identifies the radius of the service volume around the transmitter in Nautical miles.

Source/Content: The value for this field will be derived from official government sources. If no source is provided, the default value will be blanked.

Used On: GLS Record
Length: 2 characters
Character Type Numeric
Examples: 05, 19 c-14

5.246 TDMA Slots

Definition/Description: The TDMA identifies the time slot(s) in which the ground station transmits the related approach. The high precision time source available through GPS permits utilization of Time division multiplexing or TDMA (Time Division Multiple Access), allowing multiple ground stations to share a common frequency by dividing it into eight time slots. An individual station may broadcast in one or more of eight slots.

Source/Content: The value for this field will be derived from official government sources. The range is 01 to FF. If no source is provided, the default value will be blank.

Used On: GLS Record
Length: 2 characters
Character Type: Alpha/numeric
Examples A2, 01, FF

5.247 Station Type

Description/Definition: The station type identifies the type of the differential ground station. The first character will be L for LAAS/GLS ground station, C for SCAT-1 station. The second and third character will be blank for the moment. They will indicate the interoperability standard to which the station conforms.

Source/Content: The value for this field will be derived from official government sources. If LAAS/GLS or SCAT-1 is not specified in source, the default value will be blank.

Used on: GLS record
Length: 3 characters
Character type: Alpha/Numeric
Examples: L, C

5.0 NAVIGATION DATA – FIELD DEFINTIONS (cont'd)

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5.248 Station Elevation WGS84

Description/Definition: This field identifies the WGS84 elevation of the GLS ground station described in the record.

Source/Content: The value for this field will be derived from official government sources or entered into this field in feet with respect to the WGS84 ellipsoid. When elevation is below the WGS 84 ellipsoid, the first column of the field contains a minus (-) sign.

Used on: GLS record
Length: 5 characters
Character type: Alpha/Numeric
Examples: 00530, -0140

5.249 Longest Runway Surface Code (LRSC)

Definition/Description: The "Longest Runway Surface Code" field is used to define whether or not there is a hard surface runway at the airport, the length of which is indicated in the Longest Runway field.

Source/Content: The content will be selected from the table below.

Field Content	Description
H	Hard Surface, for example, asphalt or concrete
S	Soft Surface, for example, gravel, grass or soil
W	Water Runway
U	Undefined, surface material not provided in source

Used On: Airport Records
Length: One character
Character Type: Alpha

5.250 Alternate Record Type (ART)

Definition/Description: The "Alternate Record Type" field identifiers the record as being applicable to the departure airport (take-off alternate), destination airport (arrival alternate) or a fix along the route (enroute alternate).

Source/Content: The "Alternate Record Type" will be selected from the following table:

Content	Description
AA	The Airport identifier in Columns 7 through 11 of the Primary Record are the identifier of the Arrival Airport.
DA	The Airport identifier in Columns 7 through 11 of the Primary Record are the identifier of the Departure Airport.
EA	The end fix of a Company Route is identified in Columns 7 through 15 of the Primary Record.

Used On: Alternate Records
Length: 2 characters
Character Type: Alpha

5.251 Distance To Alternate (DTA)

Definition/Description: The "Distance To Alternate" field defines either the direct (geodesic) distance from the Destination Airport or Fix to the Alternate Airport or the along track distance of an alternate Company Route.

Source/Content: When the Alternate Type field carries the character "A," the Distance to Alternate field carries the straight line (geodesic) distance in nautical miles between the Destination Airport or Fix and the Alternate Airport as listed in the Alternate Identifier fields. When the Alternate Type field carries the character "C," the Distance to Alternate field carries the cumulative along track distance for the Alternate Company Route as listed in the Alternate Identifier fields.

Used On: Alternate Records
Length: Three characters max.
Character Type: Numeric

5.252 Alternate Type (ALT TYPE)

Definition/Description: The "Alternate Type" field is an information processing indicator. The Alternate Destination can be defined as an airport or an airport and route to an airport. This field defines that an alternate airport or, an company route is defined in the Alternate Identifier fields. c-14

Source/Content: The field will contain either the character "A" when an Airport is provided or the character "C" when a Company Route is provided.

Used On: Alternate Records
Length: One character
Character Type: Alpha

5.253 Primary and Additional Alternate Identifier (ALT IDENT)

Definition/Description: The Primary Alternate Identifier and the Additional Alternate Identifiers (two through Five) uniquely identify either an Alternate Airport or an Alternate Company Route. The determination of whether the content is an Airport Identifier or a Company Route Identifier is accomplished through the Alternate Type field.

Source/Content: The content of this field is determined by the customer.

Used On: Alternate Records
Length: 10 characters max
Character Type: Alpha/numeric

5.0 NAVIGATION DATA - FIELD DEFINITIONS (cont'd)

VIA	S/S/A AIRWAY	AREA	TO FIX	RWY TRANS	ENRT TRANS	CRUISE ALT	TERM/ ALT ARPT	ALT DIST
ALT	Blank	Area	Blank	Blank	Blank	ALT or Blank	Arpt or Heliport Ident	Dist in NM
APP	Apch Ident	Area	Optional	Blank	Tml Rte Ident or Blank	Blank	Arpt or Heliport Ident if TO FIX Ident is Terminal	Blank
AWY	Awy Ident	Area	Fix Ident	Blank	Blank	ALT or Blank	Blank	Blank
DIR, INT	Blank	Area	Fix Ident	Blank	Blank	ALT or Blank	Airport or Heliport Ident if TO FIX Ident is Terminal	Blank
SID	SID Ident	Area	Fix Ident	Rwy Ident/ All or Blank	Trans Ident or Blank	ALT or Blank	Airport or Heliport if TO FIX Ident is Terminal	Blank
SDE	SID Ident	Area	Fix Ident	Blank	Trans Ident	ALT or Blank	Airport or Heliport Ident if TO FIX Ident is Terminal	Blank
SDY	SID Ident	Area	Fix Ident	Rwy Ident	Blank	ALT or Blank	Airport or Heliport Ident if TO FIX Ident is Terminal	Blank
STR	STAR Ident	Area	Fix Ident of Blank	Rwy Ident/All	Trans Ident or Blank	ALT or Blank	Airport or Heliport Ident if TO FIX Ident is Terminal	Blank
STE	STAR Ident	Area	Fix Ident	Blank	Trans Ident	ALT or Blank	Airport or Heliport Ident if TO FIX Ident is Terminal	Blank
STY	STAR Ident	Area	Fix Ident	Rwy Ident	Blank	ALT or Blank	Airport or Heliport Ident if TO FIX Ident is Terminal	Blank
PRE	Pref Rte Ident	Area	Fix Ident	Blank	Blank	ALT or Blank	Airport or Heliport Ident if TO FIX Ident is Terminal	Blank

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Figure 5-14
Company Route Record (R)
Field Content

6.0 ENCODING STANDARDS

6.1 General

This Chapter sets forth the encoding standards to be employed for ARINC 424 and other master user data files when using the magnetic tape media.

6.2 Number of Tape Tracks

c-10 Either 9 or 16 track tapes should be used for master user tape files. The Volume Header Label encoded on the tape should include a code for identifying number of tracks on tape.

6.3 Bit Density

Data should be written at a bit density of either 1600 bits per inch or 6250 bits per inch. Both the external reel label and the Volume Header Label should indicate bit density used.

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6.4 Coding

Data should be encoded either the IBM Extended Binary Coded Decimal Interchange (EBCDIC) code or the American Standard Code for Information Interchange (ASCII) codes. Both the external reel label and the Volume Header Label should indicate encoding standard used.

6.5 Parity Convention

One of three parity conventions is to be enforced, e.g. Odd Parity, Even Parity or no Parity. Both the external reel label and the Volume Header Label should indicate parity convention used.

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6.6 Reel-File Relationship

Three reel to file relations can exist when writing data to a tape. These are one file, one reel; one file, multiple reels and multiple files, one reels. When one file occupies one reel of tape, the file is considered to be a single-section file. In this instance, a file section equates to a reel, i.e., section 1 is on reel 1. When one file extends over two or more reels of tape, the file is considered a multiple-section file. Once again, a file section equates to a reel, i.e., section 1 is on reel 1, section 2 is on reel 2, etc.

When more than one file appears on the same reel, each file is considered a single-section file and the reel is considered to be a multiple-file reel. A file section no longer equates to a reel, since more than one file appears on the same reel, i.e., file 1 and file 2 are on reel 1.

When more than one file appears on the same reel and one of those files extends over two or more reels, the group of reels containing the files is considered to be a multi-reel set.

6.7 Labels

80-character label blocks should be used to enable the software to identify reels, sets, files and sections of files stored on magnetic tape. The first four characters of each label block should identify it, the first three characters indicating label type and the fourth the number of the label of that type (e.g., HDR2 = second file header label). The following is a list of label identifiers, their meanings and the number that may be used per reel of file, according to the standards of the American National Standards Institute.

Label Type	Number	Description
VOL	1 per reel	Volume Header Label
HDR	1 per section	File Header Label 1
HDR	1 per section	File Header Label 2
EOV	1 per reel	End-of-Volume Trailer Label
EOF	1 per file	End-of-File Trailer Label

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When a file is contained on more than one reel of tape (multi-section file) an EOV label appears at the end of each section (reel) except the last section, which is terminated with and EOF label. For files which are wholly contained on one reel, an EOV label will not be present. c-8

6.7.1 Volume Header Label (VOL)

Each reel of magnetic tape is considered to be a volume and should contain a Volume Header Label to identify it. Volume Header labels should contain the following information in the indicated format:

Field Name	Relative Position	Length	Description
Label Ident	0	3	Contains "VOL"
Label Number	3	1	Contains decimal 1 to indicate this is the first and only Volume Header Label
Volume Serial Number	4	6	Contains six decimal numbers to uniquely identify this reel.
Accessibility Code	10	1	Currently not used
Reserved	11	26	blanks
Owner's Ident.	37	14	Contains data supplied by the tape supplier
Number of tape tracks	51	2	Contains two decimal numbers to identify number of tape tracks
Bit Density	53	5	Contains five decimal numbers to identify number of bits per inch used to write the tape
Coding	58	1	Contains single character to show encoding standard used. A = ASCII, E = EBCDIC
Parity Convention	59	1	Contains single character to show parity used to write tape. O = odd parity E = even parity N = no parity
Reserved	60	19	blanks
Label Standard Level	79	1	Contains the decimal 1

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6.0 ENCODING STANDARDS (cont'd)

6.7.2 Header 1 Label (HDR 1)

c-5

The format of the Header 1 label should be as follows:

Field Name	Rel. Pos.	Length	Description
Label Ident	0	3	Contains "HDR"
Label Number	3	1	Contains decimal "1"
File Name	4	17	The first 10 characters contain the file name and the last 7 characters contain spaces.
Set Ident	21	6	Contains the set identification code specified on the file specification sheets. Any alpha characters may be used.
File Section No.	27	4	Contains the volume (section) number of the volume within a file. "0001" for the first section, " 0002" for the second, etc.
File Sequence No.	31	4	Contains the sequence no. of a file within a volume set. "0001" for the first file, "0002" for the second, etc.
Generation No.	35	4	Contains Cycle Date
Generation Version	39	2	Contains spaces
Creation Date	41	6	Contains the virtual date specified when the file was created. The format is as follows: A space character followed by two numeric characters that represent the year, followed by three numeric characters that represent the sequence day within the year. (Example: 68001 = January 1, 1968.)
Expiration Date	47	6	Contains the date the file expires. This date, six weeks after the creation date, is in the same format as the creation date.
Accessibility Code	53	1	Blank
Block Count	54	6	Contains zeros (Note: The block count does not appear in this label; however, the software does keep track of the block count and stores that count in the EOV and EOF label when a file is created.
System Code	60	13	Contains spaces
Reserved	73	7	Contains spaces

6.7.3 Header 2 Label (HDR 2)

c-1

The format of the Header 2 label should be as follows:

Field Name	Rel Pos.	Length	Description
Label Identifier	0	3	Contains "HDR"
Label Number	3	1	Contains decimal "2"
Record Format	4	1	Contains the alpha character F to indicate that the records in the file are of fixed length
Block Length	5	5	Contains the decimal number 01980, i.e., the maximum number of characters in a block
Record Length	10	5	Contains the decimal number 00132, i.e., the number of characters in a fixed length record
Reserved	15	35	Contains spaces
Buffer Offset	50	2	Contains a decimal number indicating the number of characters to be ignored at the beginning of a block, i.e. 00 in this application.
Reserved	52	28	Contains spaces.

6.7.4 End-of-File Trailer Label (EOF)

The format of the End-of-File Trailer label should be as follows:

Field Name	Rel. Pos.	Length	Description
Label Identifier	0	3	Contains "EOF"
Label Number	3	1	Contains decimal "1"
	4	50	Same as HDR1 label
Block Count	54	6	Contains the decimal number that indicates the number of blocks in the last section of a file (or the entire file if the file is only one section long).
	60	20	Same as HDR 1 label

6.0 ENCODING STANDARDS (cont'd)

6.7.5 End-of-Volume Trailer Label (EOV)

The format of the End-of-Volume Trailer label should be as follows:

Field Name	Rel. Pos.	Length	Description
Label Identifier	0	3	Contains "EOV"
Label Number	3	1	Contains 1
	4	50	Same as HDR 1 label
Block Count	54	6	Contains the number of data blocks in this section of the file
	60	20	Same as HDR 1 label

6.8 Tape Marks

One tape mark should be used to separate labels from data and data from labels. Two tape marks should be used following the last EOF label on a tape and following each EOV label.

The tape mark should consist of the series of binary characters 000 10011. This is equivalent to the ISO alphabet #5 character "DC3."

6.9 Summary of Tape Data Layout

As indicate above, there are three basic configurations in which data may appear on tape:

1. One file is wholly contained on one reel of tape.
2. One file occupies multiple reels of tape.
3. Several files are contained on one reel of tape.

One file on one reel
VOL1 Label
HDR1 Label
HDR2 Label
- - - -TM- - - -
ARINC DATA
- - - -TM- - - -
EOF1 Label
c-8 EOF2 Label
- - - -TM- - - -
- - - -TM- - - -

One file on three reels

REEL 1	REEL 2	REEL 3
VOL1 Label	VOL1 Label	VOL1 Label
HDRL Label	HDR1 Label	HDR1 Label
HDR2 Label	HDR2 Label	HDR2 Label
- - - -TM- - - -	- - - -TM- - - -	- - - -TM- - - -
ARINC DATA	ARINC DATA	ARINC DATA
- - - -TM- - - -	- - - -TM- - - -	- - - -TM- - - -
EOV1 Label	EOV1 Label	EOF1 Label
- - - -TM- - - -	- - - -TM- - - -	EOF2 Label
- - - -TM- - - -	- - - -TM- - - -	- - - -TM- - - -

Two files on one reel
VOL1 Label
HDR1 Label
HDR2 Label
- - - -TM- - - -
ARINC DATA
- - - -TM- - - -
EOF1 Label
EOF2 Label
- - - -TM- - - - c-8
HDR1 Label
HDR2 Label
- - - -TM- - - -
ARINC DATA
- - - -TM- - - -
EOF1 Label
EOF2 Label
- - - -TM- - - -
- - - -TM- - - -

6.9.1 One File, One Reel

This configuration has no EOV marker to indicate another reel is required as it has all the data on this one reel. Therefore, the configuration looks like this:

VOL	Volume Label (6.7.1)
HDR1	Header 1 Label (6.7.2)
HDR2	Header 2 Label (6.7.3)
-TM-	Tape Mark (6.8)
ARINC 424 Data	
-TM-	Tape Mark (6.8)
EOF	End-of-File Trailer Label (6.7.4)
EOF	End-of-File Trailer Label (6.7.4)
-TM-	Tape Mark (6.8)
-TM-	Tape Mark (6.8)

6.9.2 One File, Multiple Reels

This configuration has a EOV at the end of each reel except for the last reel in the set which has a EOF. Therefore, the configuration looks like this:

Reel 1

VOL	Volume Label (6.7.1)
HDR1	Header 1 Label (6.7.2)
HDR2	Header 2 Label (6.7.3)
-TM-	Tape Mark (6.8)
ARINC 424 Data	
-TM-	Tape Mark (6.8)
EOV	End-of-Volume Trailer Label (6.7.5) c-10
-TM-	Tape Mark (6.8)
-TM-	Tape Mark (6.8)

Reel 1 + n

VOL	Volume Label (6.7.1)
HDR1	Header 1 Label (6.7.2)
HDR2	Header 2 Label (6.7.3)
-TM-	Tape Mark (6.8)
ARINC 424 Data	
-TM-	Tape Mark (6.8)
EOV	End-of-Volume Trailer Label (6.7.5)
-TM-	Tape Mark (6.8)
-TM-	Tape Mark (6.8)

6.0 ENCODING STANDARDS (cont'd)

Last Reel

VOL	Volume Label (6.7.1)
HDR1	Header 1 Label (6.7.2)
HDR2	Header 2 Label (6.7.3)
-TM-	Tape Mark (6.8)
ARINC 424 Data	
-TM-	Tape Mark (6.8)
EOF	End-of-File Trailer Label (6.7.4)
EOF	End-of-File Trailer Label (6.7.4)
-TM-	Tape Mark (6.8)
-TM-	Tape Mark (6.8)

c-10 6.9.3 Multiple Files, One Reel

This configuration has no EOV marker to indicate another reel is required as it has all the files on this one reel. Therefore, the configuration looks like this:

VOL	Volume Label (6.7.1)
HDR1	Header 1 Label (6.7.2)
HDR2	Header 2 Label (6.7.3)
-TM-	Tape Mark (6.8)
ARINC 424 Data	
-TM-	Tape Mark (6.8)
EOF	End-of-File Trailer Label (6.7.4)
EOF	End-of-File Trailer Label (6.7.4)
-TM-	Tape Mark (6.8)
HDR1	Header 1 Label (6.7.2)
HDR2	Header 2 Label (6.7.3)
-TM-	Tape Mark (6.8)
ARINC 424 Data	
-TM-	Tape Mark (6.8)
EOF	End-of-File Trailer Label (6.7.4)
EOF	End-of-File Trailer Label (6.7.4)
-TM-	Tape Mark (6.8)
-TM-	Tape Mark (6.8)

6.10 CRC Calculations

6.10.1 Precision Approach Path Point Cyclic Redundancy Check (CRC) Overview

A CRC is an error detection algorithm capable of detecting small changes in a block of data. Data, which require high integrity often, utilize CRCs to detect changes at the "bit" level. A high integrity requirement is called for when a small change in a data block can cause programs to fail, or produce erroneous results. c-14 Such is the case for straight and advanced landing approach operations conducted using information contained in a Precision RNP RNAV Approach Procedure Path Point Record.

A CRC algorithm treats a data block as a single (large) numerical value. The data block is divided by a fixed number (called a "generator polynomial") whose value and magnitude is determined based on the level of integrity desired. The remainder of the division is the CRC value for the data block. CRC values are stored or transmitted with their corresponding data blocks. Integrity of a data block can be confirmed when necessary by reapplying the CRC algorithm and comparing the result with the stored or transmitted CRC value. If the data is corrupt, it is highly probable that the two CRC values will differ.

The preceding paragraph oversimplifies the CRC process. The real ability for a CRC to ensure high levels of integrity is provided by polynomial modulo two arithmetic and a sufficiently large generator polynomial. Polynomial arithmetic mod2 is a form of division that is fast, efficient, and sufficient for the purpose of integrity protection. The generator polynomial of a CRC algorithm is measured in bit size where the polynomial coefficients are binary values equal to 0 or 1. The level of integrity protection provided by a specific generator polynomial is a function of the highest order term in the polynomial. The higher the term, the higher the level of protection.

6.10.2 Generator Polynomials:

$G[x] = x^{16}+x^{12}+x^5+1$ (CRC-CCITT algorithm)

$G[x] = x^{32}+x^{26}+x^{23}+x^{22}+x^{16}+x^{12}+x^{11}+x^{10}+x^8+x^7+x^5+x^4+x^2+x+1$ (CRC-32Q algorithm)

The CRC-CCITT algorithm is a 16 bit algorithm and provides less protection than the CRC-32Q algorithm, which is a 32 bit algorithm. Generator polynomial coefficients are binary, meaning equal to 0 or 1. Therefore, only terms with a coefficient of 1 are shown in a generator polynomial. A rule of thumb for determining the upper bound of the probability, e, of an error escaping undetected is 2^{-r}, where r is the magnitude (bit value) of the generator polynomial.

For CRC-CCITT, e " $2^{-16} = 1.5259 \times 10^{-5}$. For CRC-32Q, e " $2^{-32} = 2.3283 \times 10^{-10}$.

6.10.3 32 Bit CRC Calculation c-14

CRC are calculated on a "bit-wise" basis. This means that the data elements of a data block are concatenated into a single string of values, which, when converted to their binary equivalents, comprise a string of binary "bits."

Each bit is either a 0 or 1. A CRC value represents the remainder of a modulo 2 division of two bit streams. M(x), the data block bit stream, is the dividend in the modulo 2 division and a predefined generator polynomial is the divisor. The remainder is commonly and hereafter referred to as R(x). As an example of a bit stream, if the CRC-32Q generator polynomial, as shown in the previous section, was being used in a CRC calculation the divisor would be:

110000000101000000101000000110101011

The equation for calculating a 32 bit CRC is where:

- x^{32} is a multiplier which appends 32 zero bits to the end of M(x)
- M(x) is the data block bit stream
- G(x) is the predetermined generator polynomial of the 32nd order
- Q(x) is the quotient of the modulo 2 division
- R(x) is the remainder of the modulo 2 division and is coded with the coefficient of x^{31} as the most significant (leftmost) bit.

6.0 ENCODING STANDARDS (cont'd)

6.10.3 32 Bit CRC Calculation (cont'd)

When using a CRC to protect the integrity of a data block, the data contained in the block is said to be "wrapped" by a CRC. When checking the integrity of the wrapped data there are two different methods that can be employed. The two methods are:

1. Recalculate the data block's CRC value using the same generator polynomial. Then compare the resultant CRC value to the stored or transmitted CRC value. If the values are equivalent, then the data has integrity.

2. Perform a modulo 2 division with the stored or transmitted CRC value appended to the end of the data block bit stream as the dividend and the generator polynomial as the divisor. If the remainder, R(x), is equal to zero, then the data has integrity.

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Note 1: G(x) is of the form (1+x)P(x), where P(x) is a primitive and irreducible polynomial of order r-1 = n-k-1.

Note 2: All arithmetic operations are performed modulo 2.

Note 3: This explanation is based on a 32 bit CRC. CRCs based on other bit register sizes work on the same principal.

6.11 Application of CRC for Integrity Protection of Straight & Advanced Landing Approach Operations

6.11.1 Data Block Structure, M(x)

Although data may be organized and stored in any format, for the purpose of wrapping and verifying RNAV - GPS/GLS Approach Procedure Path Point data with a CRC, the data is organized in data blocks. Each data block is order dependent and contains all the information necessary for a single landing approach operation. The binary representations of the CRC "wrapped" data fields are shown below. Chapter 5 provides an explanation of each of the data fields and the allowable range of values for each field.

6.11.2 RNAV - GPS/GLS Approach Procedure Path Point Data Field Bits

Airport Identifier	32 Bits
Approach Identifier	48 Bits
Runway Identifier	40 Bits
Operation Type	16 Bits
Approach Indicator	8 Bits
Landing Threshold Point	
Latitude	72 Bits
Longitude	80 Bits
WGS-84 Ellipsoidal Height	48 Bits
Flight Path Control Point (FPCP)	
Threshold Crossing Height	16 Bits
Glide Path Angle	32 Bits
Flight Path Alignment Point (FPAP)	
Latitude	72 Bits
Longitude	80 Bits
Units of Height	8 Bits

Total bits included in the RNAV - GPS/GLS Approach Procedure Path Point Data Block - 552 Bits.

A correlation can be drawn between the binary representation and the ASCII formatted Path Point record shown in Section 5.0 of this document. The correlation is that the binary is comprised of 8 bits for each alphanumeric character in the record. The 8 bits for each character is the binary representation of each ASCII character. For example; a data block consisting of the characters AB23S, is equivalent to 65,66,50,51,83 in ASCII. This generates a 40 bit (8 bits/character x 5 characters) data block consisting of concatenated 8 bit binary equivalents The 40 bit data block would be: 0100000101000010001100100011001101010011. c-14

6.11.3 CRC - Generator Polynomial, G(x)

The generator polynomial, G(x), for use is calculating CRC values from the Path Point Data Block shown in the previous subsection is CRC-32Q:

$$G(x) = x^{32} + x^{31} + x^{24} + x^{22} + x^{16} + x^{14} + x^{8} + x^{7} + x^{5} + x^{3} + x + 1$$

The CRC-32Q generator polynomial was developed is based on performance comparisons done by Qualcomm Corporation. The results of Qualcomm's performance analysis, which are presented in the reference shown at the end of this subsection, showed a probability of undetected error below an upper bound of $2^{-32} = 2.3283064 \times 10^{-10}$ for a wide range of message lengths.

Note: The primitive, P(x), for CRC-32Q is:
$P(x) = x^{31} + x^{23} + x^{22} + x^{15} + x^{14} + x^{7} + x^{4} + x^{3} + 1$

Reference: Wolf, J. K., and R. D. Blakeney, II, 1988, "An Exact Evaluation of the Probability of Undetected Error for Certain Shortened Binary CRC Codes," MILCOM '88 Conference Proceeding, pp. 287-292 (paper 15-2), Vol. 1, Washington, D.C.

7.0 NAMING CONVENTIONS

7.1 General

This chapter establishes the coding rules for Identifiers and Name fields when government source does not provide these Identifiers or Names within the rules established by ICAO Annex 11.

ICAO Annex 11 defines the international standards for coded designators of NAVAIDS, Waypoints, Airways, Standard Instrument Arrivals Routes, and Standard Instrument Departures.

7.2 Fix Identifiers

Fix identifiers will be assigned to all waypoints with the ground rules set forth in this chapter. Section 5.13 establishes the use and limits the field to five characters maximum.

7.2.1 VOR, VORDME, VORTAC, TACAN, and Non-Directional Beacons (NDB)

Waypoints located at any of the above types of facilities will take on the official 1-, 2-, 3-, or 4-character identifier of the facility in question.

Examples:

Facility	Fix Field Entry
Los Angeles VORTAC becomes	AX
Tyndall TACAN becomes	PAM
Ft. Nelson NDB becomes	YE

7.2.2 Non-Directional Beacons (NDB)

For systems employing the "NDB as Waypoint" concept, waypoints located at NDB's should be identified by the use of the station identifier followed by the alpha characters "NB."

Examples:

Facility	Fix Field Entry
Fort Nelson, Can becomes	YENB
Newark, NJ becomes	EWRNB

7.2.2.1 Navaid Waypoint

When the position of a navaid is used to create a waypoint such as during navaid outage or lack of complete navaid information, the waypoint identifier will be created using the navaid name, following the conventions of Section 7.2.3 for One Word Names and Multiple Word Names. For example, a waypoint established at the position of a navaid with the name "Uzgorod" would have an identifier of UZGOD. A waypoint established at the position of a navaid with the name of "Camp Henry" would have an identifier of CHENY. c-14

7.2.2.2 Airport Waypoint

When the position of an airport is used to create a waypoint, the waypoint identifier will be created either from the airport identifier, if known, or from the airport name, following the conventions of Section 7.2.3 for One Word Names and Multiple Word Names. For example, a waypoint established at the position of an airport with the identifier of JHKD and a name of Juhankerd Airfield would used the airport identifier JHKD as the waypoint identifier. A waypoint established at the position of an airport without an identifier but with a name of Rondaville Airport would have an identifier of RONDE. c-14

7.2.3 Named RNAV Waypoints, Intersections, and Reporting Points

In many countries these waypoints are assigned unique five-character names, and the identifier is the same as the name. For waypoints not so named, identifiers are developed using the following rules sequentially until five, or fewer, character groups remain.

ONE-WORD NAMES

A. If five or less characters are involved, use the full name.

Examples:

Facility	Fix Field Entry
DOT becomes	DOT
ACRA becomes	ACRA
LOGAN becomes	LOGAN

B. If the name is more than five characters, reduce to five characters with one or more of the following methods.

1. Eliminate double letters

Examples:

Waypoint Name	Fix Field Entry
KIMMEL becomes	KIMEL
COTTON becomes	COTON
RABBITT becomes	RABIT

2. Keep the first letter, first vowel, and last letter. Drop
other vowels starting from right to left.

Examples:

Waypoint Name	Fix Field Entry
ADOLPH becomes	ADLPH
BAILEY becomes	BAILY
BURWELL becomes	BURWL

3. Drop consonants, starting from right to left

Examples:

Waypoint Name	Fix Field Entry
ANDREWS becomes	ANDRS
BRIDGEPORT becomes	BRIDT

MULTIPLE WORD NAMES

Use the first letter of the first word and shorten the last word using the rules for One-Word names to reduce it four characters, for a total of five characters.

Examples:

Waypoint Name	Fix Field Entry
CLEAR LAKE becomes	CLAKE
ROUGH AND READY becomes	RREDY

7.0 NAMING CONVENTIONS (cont'd)

7.2.3 Named RNAV Waypoints, Intersections, and Reporting Points (cont'd)

PHONETIC LETTER NAMES

When an ICAO phonetic alpha character is used as a waypoint name (Alpha, Bravo, Charlie, etc.), use the rules established in One-Word Names. When more than one waypoint in a country has the same phonetic name, obtain uniqueness by applying Duplicate Identifier rules below.

Examples:

Waypoint Name	Fix Field Entry
ALPHA becomes	ALPHA
NOVEMBER becomes	NOVMR
CHARLIE becomes	CHARE

Two waypoints having the same Waypoint Identifiers within the same country two-letter ICAO, for example, CHARLIE, would become CHAR1 and CHAR2.

When a double phonetic, such as TANGO INDIA, is used as the waypoint name, use the rules established under Multiple Word Names. For example, TANGO INDIA becomes TINDA.

When a phonetic alpha character followed by a numeric and/or other alpha character (A1, A1N, B2, etc.), is used as the waypoint name, it will be coded in the data base the same as shown on aeronautical charts.

7.2.4 Unnamed Waypoints

Waypoints not assigned unique five-character names, but where a defined fix is required for charting and is to be included in navigation data bases, will have identifiers developed using the following guidelines:

A. Unnamed turn points, intersections, and bearing/distance waypoints

If the unnamed turn point, intersection, or bearing/distance is collocated with a named waypoint or NAVAID station on a different route structure (e.g., low level or approach), the name or identifier of the collocated waypoint should be used.

Example: Unnamed turn point on J2 between Lake Charles (LCH) and New Orleans (MSY) VORTACs is coincidental with the Lafayette (LFT) low level VORTAC. LFT should be used as the identifier code for the turn point.

Identifier codes for unnamed turn points, intersection, or bearing/distance waypoints that are not coincidental with named waypoints should be constructed by taking the identifier code of the reference NAVAID for the turn point/intersection/(bearing/ distance waypoint) (expected to be the nearest NAVAID serving the airway structure in which it is located) and the distance from the NAVAID to the turn point/intersection/(bearing/distance waypoint). If the distance is 99 nautical miles or less, the NAVAID identifier should be placed first, followed by the distance. If the distance is 100 nautical miles or more, the last two digits only should be used and placed ahead of the NAVAID identifier.

NAVAID	DISTANCE	CODE
INW	18	INW18
CSN	106	06CSN
TCS	89	TCS89

B. FIR, UIR, and Controlled Airspace Reporting Positions

In cases where the government authority does not provide unique, five-letter or less waypoint names and in cases where the government supplied name cannot be converted to a unique five-letter identifier using previous rules, the following rules shall be applied in developing an identifier for such waypoints.

1. FIR - use the three characters "FIR" plus a numeric from 02 to 99. An identifier so developed is to be unique within the geographical area code.

2. UIR - use the three characters "UIR" plus a numeric from 02 to 99. An identifier so developed is to be unique within the geographical area code.

3. FIR/UIR -use "FIR" and a numeric as indicated above.

4. Controlled - use the three- letter characters for the Airspace type of controlled airspace plus a numeric from 02 to 99. If these are Terminal Waypoints, they are to be unique within the Terminal Area. If these are Enroute Waypoints, they are to be unique within the geographic area code. Examples of controlled airspace types are:

TMA Terminal Area
CTR Controlled Zone
ATZ Aerodrome Traffic Zone
CTA Controlled Area
TIZ Traffic Information Zone

7.2.5 Reporting Positions Defined by Coordinates

Entry, Exit and intermediate points within Oceanic Control Areas are often defined by waypoints which are "undesignated," meaning there is no published five-letter-name-code. These points are quite often made available in source documentation as geographical coordinates, expressed in full degrees or half degrees of Latitude and full degrees of Longitude. When such waypoints are to be entered into a database, the following rules are to be applied: c-14

A. Full Degree of Latitude

1. Positions in the northern hemisphere use the letters "N" and "E," the southern hemisphere use the letters "S" and "W."

2. Latitude will always precede Longitude.

3. Both will use numerics for latitude and longitude as follows:

   a. Latitude - use values provided by source.

   b. Longitude - use only the last two digits of the three digit longitude. Placement of the longitude value in reference to the identifier character (of "N," "S," "W" or "E," see below) will provide the information as to whether the longitude digit dropped was "0" or "1." That character will follow the longitude digits if the longitude is less than 100 degrees and precede the longitude digits if the longitude is equal to or greater than 100.

c. Use of a single character to provide both latitude and longitude information:

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"N" = North Latitude and West Longitude
"E" = North Latitude and East Longitude
"S" = South Latitude and East Longitude
"W" = South Latitude and West Longitude

d. Examples:

North Latitude/West Longitude, longitude less than 100 degrees

N5200/W07500 - 5275N
N5000/W04000 - 5040N
N0700/W00800 - 0708N

North Latitude/West Longitude, longitude equal to or greater than 100 degrees

N7500/W17000 - 75N70
N0700/W12000 - 07N20

North Latitude/ East Longitude, longitude less than 100 degrees

N5000/E02000 - 5020E
N7500/E05000 - 7550E
N0600/E00800 - 0608E

North Latitude/East Longitude, longitude equal to or greater than 100 degrees

N7500/E15000 - 75E50
N0600/E11000 - 06E10

South Latitude/West Longitude, longitude less than 100 degrees

S5200/W07500 - 5275W
S5000/W04000 - 5040W
S0700/W00800 - 0708W

South Latitude/West Longitude, longitude equal to or greater than 100 degrees

S7500/W17000 - 75W70
S0700/W12000 - 07W20

South Latitude/East Longitude, longitude less than 100 degrees

S5000/E02000 - 5020S
S7500/E05000 - 7550S
S0600/E00800 - 0608S

South Latitude/East Longitude, longitude equal to or greater than 100 degrees

S7500/E15000 - 75S50
S0600/E11000 - 06S10

B. Half Degree of Latitude

1. Positions in the northern hemisphere use the letters "N" and "E," the southern hemisphere use the letters "S" and "W."

2. Latitude will always precede Longitude.

3. Both will use numerics for latitude and longitude as follows: c-14

a. Latitude - use the full degree values provided by source. Placement of the latitude value in reference to the identifier character (of "N," "S," "W" or "E," see below) will provide the information as to whether the latitude is full degree or half degree.

b. Longitude - use only the last two digits of the three digit longitude. Placement of the longitude value in reference to the identifier character (of "N," "S," "W" or "E," see below) will provide the information as to whether the longitude digit dropped was "0" or "1." That character will follow the longitude digits if the longitude is less than 100 degrees and precede the longitude digits if the longitude is equal to or greater than 100.

c. Use of a single character to provide both latitude and longitude information:

"N" = North Latitude and West Longitude
"E" = North Latitude and East Longitude
"S" = South Latitude and East Longitude
"W" = South Latitude and West Longitude

d. Examples:

North Latitude/West Longitude, longitude less than 100 degrees

N5630/W02000 - N5620
N5030/W04000 - N5040
N0730/W00800 - N0708

North Latitude/West Longitude, longitude equal to or greater than 100 degrees

N7530/W17000 - 7N570
N0730/W12000 - 0N720

North Latitude/ East Longitude, longitude less than 100 degrees

N5030/E02000 - E5020
N7530/E05000 - E7550
N0630/E00800 - E0608

North Latitude/East Longitude, longitude equal to or greater than 100 degrees

N7530/E15000 - 7E550
N0630/E11000 - 0E610

7.0 NAMING CONVENTIONS (cont’d)

7.2.5 Reporting Positions Defined by Coordinates (cont’d)

South Latitude/West Longitude, longitude less than 100 degrees

S5230/W07500 - W5275
S5030/W04000 - W5040
c-14 S0730/W00800 - W0708

South Latitude/West Longitude, longitude equal to or greater than 100 degrees

S7530/W17000 - 7W570
S0730/W12000 - 0W720

South Latitude/ East Longitude, longitude less than 100 degrees

S5030/E02000 - S5020
S7530/E05000 - S7550
S0630/E00800 - S0608

South Latitude/East Longitude, longitude equal to or greater than 100 degrees

S7530/E15000 - 7S550
S0630/E11000 - 0S610

7.2.6 Terminal Waypoints

The following rules should be applied in developing identifiers for waypoints used solely in terminal area procedures. Such waypoint identifiers will be unique only for the airport specified; a waypoint identifier used in a terminal area cannot be repeated in that terminal area but can be used in an enroute area encompassed by the same geographical area code. Terminal waypoint identifiers can be repeated in areas covered by different geographical codes. These identifier developing rules should only be applied when the waypoints in question have not been assigned official names/identifier by the government authority.

c-14 A. Airport/Heliport or Runway/Helipad related Terminal Waypoints

Single Approach Procedure for a given runway or helipad coded and Waypoints common to more than one approach.

The following two-character codes are to be added to the runway identifier or helicopter approach alignment bearing to create an airport related waypoint identifier when no named waypoint has been established by the government source for the fix type:

c-14

FF = Final Approach Fix
AF = Initial Approach Fix
IF = Intermediate Approach Fix
CF = Final Approach Course Fix
MA = Missed Approach Point Fix
SD = Stepdown Fix (when not using convention in paragraph “E”)
RW = Runway Fix
OM = Outer Marker Fix
MM = Middle Marker Fix
IM = Inner Marker Fix
BM = Backcourse Marker Fix
TD = Touchdown Fix inboard of runway threshold
HC = Helipad Fix
EP = Final End Point

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Multiple Approach Procedures for a given runway or helipad coded for which common waypoints cannot be established:

The following two-character codes are to be added to the runway identifier to create an airport-related waypoint identifier when no named waypoint has been established by the government source for the fix type:

Fx = Final Approach Fix, where “x” equals the “Route Type” (Section 5.7) for the procedure in question
Ax = Initial Approach Fix, where “x” equals the “Route Type” (Section 5.7) for the procedure in question
Ix = Intermediate Approach Fix, where “x” equals the “Route Type” (Section 5.7) for the procedure in question
Cx = Final Approach Course Fix, where “x” equals the “Route Type” (Section 5.7) for the procedure in question
Mx = Missed Approach Point Fix, where “x” equals the “Route Type” (Section 5.7) for the procedure in question
Sx = Step-Down Fix Note: if multiple step-down fix waypoints need to be created, replace “D” with another character, retain the “S.”
Rx = Runway Centerline Fix, where “x” equals the “Route Type” (Section 5.7) for the procedure in question
Tx = Touchdown Fix inboard of runway threshold, where “x” equals the “Route Type” (Section 5.7) for the procedure in question

The convention for Multiple Approaches/Multiple Waypoints is contained in Table 7-1.

Note: “C-T-L” is “Circle-To-Land” Approach

The prefixes indicated in the table above assume that a unique geographical position (Latitude/Longitude) is required for each Waypoint and the “common waypoint” idea cannot be used. Should a single waypoints' geographical position be such that it will serve as the same waypoint type for more than one coded approach procedure, a “common waypoint”; the Single Approach/Common Waypoint convention shall be used.

Note on prefixes for FMS(F) Approach Waypoints:

As the majority of the prefixes generated using the standard convention and the Route Type “F” produced duplicates or two character codes that would be easily confused with other coded, the numeric/alpha/runway identifier concept is used.

B. Bearing and Distance Waypoints

Identifiers should be developed by the application of the following rules: c-14

1. The first character of the fix identifier should be “D.”

7.0 NAMING CONVENTIONS (cont’d)

2. Character 2 through four should simplify the Navaid course on which the waypoint lies.

c-14 3. The last character should be the distance of the radius defining the position of the waypoint. This radius should be expressed as the equivalent letter of the alphabet, i.e., A = 1nm, G = 7nm, o = 15nm, etc.

4. If the arc radius is greater than 26 NM, then use the convention for unnamed Turn Points, Intersections, and Bearing/Distance Waypoints.

5. If the arc radius is provided in official government source as nautical miles and tenths of nautical miles, the letter of the alphabet will reflect values rounded to full nautical miles, i.e., 10.5nm = 11nm or “K,” 10.4nm = 10nm or “J.” All values between 0.1 and 1.4 will be character “A.”

C. Along Track Distance Waypoints

Along Track Distance Waypoints are expressed in government source documentation as being “x” number of nautical miles from a named waypoint/fix. On aeronautical charts, they are normally identified as “xx.x NM from Named Waypoint.”

When not provided by the source document, identifiers for such waypoints should be developed from the along track distance portion of the source information, in two parts:

Part One **-** the distance in nautical miles and tenths of nautical miles when the tenths is greater than zero, with the decimal point suppressed. Tenths values equal to zero are dropped.

Part Two **-** the suffix “NM” if the value is equal to or less than 9.9 or a prefix of “NM” if the value is greater than 9.9.

Examples:

3.0 NM from DOOTY should be expressed as 3NM.
2.8 NM from CHASS should be expressed as 28NM.
11.0 NM from BACUP should be expressed as NM11.
13.8 NM from KITTY should be expressed as NM138.

7.0 NAMING CONVENTIONS (cont'd)

7.2.6 Terminal Waypoints (cont'd)

Waypoint Type	Waypoint codes based on the procedure type.					
	ILS (I)	ILS (L)	ILS (B)	VOR (V)	NDB (N)	MLS (M)
IAF	AI	AL	AB	AV	AN	AM
IF	II	IL	IB	IV	IN	IM
FACF	CI	CL	CB	CV	CN	CM
FAF	FI	FF	FB	FV	FN	FM
MAP	MI	ML	MB	MV	MN	MM
TDP	TI	TL	TB	TV	TN	TM
Step-down	SI	SL	SB	SV	SN	SM
FEP	EI	EL	EB	EV	EN	EM
	RNAV (R)	TACAN (T)	IGS (G)	LDA (X)	SDF (U)	GPS (P)
IAF	AR	AT	AG	AX	AU	AP
IF	IR	IT	IG	IX	IU	IP
FACF	CR	CT	CG	CX	CU	CP
FAF	FR	FT	FG	FX	FU	FP
MAP	MR	MT	MG	MX	MU	MP
TDP	TR	TT	TG	TX	TU	TP
Step-down	SR	ST	SG	SX	SU	SP
FEP	ER	ET	EG	EX	EU	EP
	MLS (W)	MLS (Y)	RNAV GPS Required (E)	FMS (F)	LAAS-GPS/GLS (J)	WAAS-GPS (K)
IAF	AW	AY	AE	1F	AJ	AK
IF	IW	IY	IE	2F	IJ	IK
FACF	CW	CY	CE	3F	CJ	CK
FAF	FW	FY	FE	4F	FJ	FK
MAP	MW	MY	ME	5F	MJ	MK
TDP	TW	TY	TE	6F	TJ	TK
Step-down	SW	SY	SE	7F	SJ	SK
FEP	EW	EY	EE	8F	EJ	EK

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Table 7-1 Multiple Approaches/Multiple Waypoints

D. Constant Radius to a Fix Waypoints

The "Constant Radius To A Fix" Path Terminator (RF LEG) has available a constellation of three fixes to assist in defining the arc. These are the ARC Center Fix, the Initial Fix, and the Ending Fix. As the waypoints in question will be related to a specific terminal procedure or set of procedures for an airport, these waypoints are defined as Terminal Waypoints.

When not provided by the source document, identifiers for such waypoints should be developed from their use in the arc definition, in two parts:

Part One - a three character alpha code indicating position within the constellation:

ARC = ARC Center Waypoint
AIF = ARC Initial Waypoint
AEF = ARC Ending Waypoint

Part Two - a two character numeric that ensures a unique waypoint within the set of terminal waypoints for a given airport.

Examples: ARC01, AIF01, AEF01

E. Unnamed Step-down Fix Waypoints

The majority of published, unnamed step-down fix waypoints are defined by DME distances from a DME associated with procedure reference facility. The naming convention for these points makes use of that general standard. The convention will still be used for unnamed step-down fix waypoints even if they are not DME defined.

1. Two digits to identify the distance) c-14
2. Three characters to identify the procedure type.
3. Position digits to identify decimal or full nautical miles.

Examples. An unnamed step-down fix at 0.5 DME from an ILS DME = 05ILS

An unnamed step-down fix at 1.7 DME from a LOC DME = 17LOC

An unnamed step-down fix at 3.5 GPS = 35GPS

An unnamed step-down fix at 12 DME from a VORDME = DME12

7.0 NAMING CONVENTIONS (cont'd)

An unnamed step-down fix at 7 DME from a TACAN = TAC07

An unnamed step-down fix at 3.5NM from the threshold = 35THR

If duplications result within an airport from this convention, the duplicate and subsequent waypoint idents will carry a number replacing the last of the three characters.

Examples: The first unnamed step-down fix at 3.5NM from the threshold = 35THR

c-14 The second unnamed step-down fix at 3.5NM from the threshold = 35TH2

F. Navaid/Distance Convention.

Although the convention for waypoint identifiers using a navaid identifier and the distance from the navaid at which the waypoint is located, (see Section 7.2.4 A, Unnamed Waypoints) is permissible for Terminal Waypoints, preference should be given to using the conventions of this Section (7.2.6), resorting to the rules of 7.2.4 only when distances are greater than 26NM. The conventions of Section 7.2.4 A should never be used for waypoints where the distances is 10NM or less.

7.3 Waypoint Name/Description

The waypoint Name field is assigned to all waypoints in accordance with the ground rules set forth in this section. ICAO Document 4444 defines an international standard for the name of both officially assigned and non-assigned designators at significant points along a route of flight. These rules are in accordance with that standard.

7.3.1 Named Waypoints

UNIQUE FIVE-LETTER

The name field will contain the same five-letter name as the Waypoint Identifier field.

Examples:

Fix Ident	Fix Name
LOGAN	LOGAN

NAME WITH MORE THAN FIVE LETTERS

The name field will contain the full name of the fix.

Examples:

Fix Ident	Fix Name
RABIT	RABBITT
RREDY	ROUGH AND READY

NAMES WITH MORE THAN FIVE LETTERS AND AN ASSIGNED FIX IDENTIFIER

The name field will contain the full name of the fix with the assigned identifier in parenthesis.

Examples:

Fix Ident	Fix Name
SPH	SEA PERCH (SPH)
CRP	CARP (CRP)

7.3.2 Unnamed Waypoints

UNNAMED TURN POINTS, INTERSECTIONS, AND BEARING/DISTANCE WAYPOINTS

The name field for unnamed waypoints whose identifiers are established under rule 7.2.4 will have a description of the waypoint to assist in finding the location on aeronautical charts. This description will use the forming NAVAID identifier and bearing/distance information.

Examples:

Fix Ident	Fix Name	
ABC12	ABC090012	ABC 090 degrees, 12 nm
81ABC	ABC090181	ABC 090 degrees, 181 nm
AB13	AB180013	AB 180.3 degrees 12.8 Decimal values, round up for .5 or greater and round down for .4 or less
D185J	ABC185010	ABC 185 degrees, 10 nm

FIR/UIR AND CONTROLLED AIRSPACE REPORTING POSITIONS

The name field will be developed under the same guidelines as for the rules above with the addition of a boundary description in parenthesis. Any additional data added must start in position 13 of the name field.

Examples:

Fix Ident		Fix Name
FIR05	ABC090012	(FIR)
FIR06	ABC090105	(FIR/UIR)
FIR08	AB180013	(FIR/UIR/UTA)

Use the NAVAID/Bearing/Distance name whenever possible rather than the Latitude and Longitude method.

For those fixes that cannot be described using NAVAID/Bearing/Distance description, the name field may contain the latitude/longitude of the fix followed by a boundary description.

Examples:

Fix Ident	Fix Name	Actual Position
UIR05	6100N01234W (OCTA)	N6100.0 W012 34.0
UIR06	4028N01500W (OCTA)	N40 27.5 W015 00.0

REPORTING POSITIONS DEFINED BY COORDINATES

Identifiers for waypoints that are defined on aeronautical charts by latitude and longitude are outlined in paragraph 7.2.5. The name field for these waypoints will be coded according to the following rules:

Latitude will be shown before longitude:

If either value contains minutes greater than zero, both values will show minutes (11 character rules).

7.0 NAMING CONVENTIONS (cont'd)

7.3.2 Unnamed Waypoints (cont'd)

If both values contain minutes of zero (degrees only), both values will omit the minutes (7 character rules).

Other descriptive information, in parenthesis, may be added but must start in position 13 of the fix name field.

Examples:

Fix Ident	Fix Name	Actual Position
4708N	47N008W	N4700.0 W008 00.0
6010N	60N010W (OCTA)	N60 00.0 W010 00.0

7.3.3 Airport-Related Waypoints

MARKERS AS TERMINAL WAYPOINTS

For Markers that are shown as Terminal Waypoints, the runway with which the marker is associated will be included in the name field.

Pos 1 and 2: OM, IM, MM or BM
Pos 3: blank
Pos 4 thru 8: runway identifier
Pos 9: blank
Pos 10 thru 25: additional name when required

Examples:

Fix Ident	Fix Name	
OM18	OM RW18	
ALTUR	OM	RW26L
ALTUR		

7.3.4 Navaid Waypoint

The Name/Description field of a waypoint established at the position of a navaid will contain the full navaid name, and navaid type when known.

Examples:

Fix Ident	Fix Name
UZGOD	Uzgorod NDB
CHENY	Camp Henry VORTAC

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7.3.5 Airport Waypoint

The Name/ Description field of a waypoint established at the position of an airport will contain the full airport name and the published "airport term."

Examples:

Fix Ident	Fix Name
JHKD	Juhankerd Airfield
RONDE	Rondaville Airport

7.4 SID/STAR Procedure Identifiers

Naming Rules

When source documents for procedure identifiers published by the controlling agency include computer abbreviations, they will be used in the appropriate fields. (c-10) When the source provide codes designations are not compatible with the requirements of an aeronautical database, modifications are required. In such cases, SID/STAR identifiers are assigned to all procedures in accordance with the ground rules set forth in this Chapter. The SID/STAR identifier must be limited to a maximum of 6 characters in length. Current international standards for assigning coded designators permit up to 7 characters (ICAO Annex 11, Appendix 3). These seven characters normally consist of a basic indicator, validity indicator, and, when required, a route indicator. The basic indicator names the significant point where the departure terminates or the arrival begins. The ICAO validity indicator publicizes the current edition of (c-10) the arrival or departure. This is a numeric character from one to nine. The ICAO route indicator is an alpha character which is added, as necessary, to distinguish between more than one departure terminating at the same significant point or arrival beginning at the same point.

A. For a published SID or STAR identifier not derived from the ending/beginning NAVAID or waypoint follow these rules:

If the identifier is:

1. Alphanumeric, then shorten the published name down to six characters by simply dropping characters from the name from right to left. If such a SID or STAR uses numeric or alpha detail, always retain that suffix (validity/route indicator) detail, dropping an additional number of characters from the name as required.

   Examples:

   POGO Departure, no waypoint named POGO, would be POGO
   North Departure (or Departure to North), would be NORTH
   Military One Arrival would be MILIT1
   Noise Abatement Six Departure would be NOISE6
   Arrival Seven would be ARRIV7

2. Either all numeric or a runway identifier, then add the characters DEP for Departure or ARR for Arrival to the identifier, dropping letters (on DEP or ARR) from right to left where required.

   Examples:

   One Departure would DEP1
   31 Arrival would be ARR31
   131 Departure would be DEP131
   311 Arrival would be ARR311
   1001 Departure would be DE1001
   2000 Arrival would be AR2000

   Runway 07 Departure would be DEP07
   Runway 25 Arrival would be ARR25
   Runway 01L Departure would be DEP01L

B. For a published SID or STAR identifier derived from a NAVAID or Waypoint follows these rules:

If the SID (departure) terminates or STAR (arrival) begins with a

1. NAVAID, then use the ident of the NAVAID in all cases, even when the NAVAID "name" is five characters or less.

   Examples:

7.0 NAMING CONVENTIONS (cont'd)

Bucks Seven Arrival from Bucks VOR "BKS" would be BKS7
Kellogg Five Alpha Departure to Kellogg VOR "WDK" would be WDK5A
Fink Two Delta Arrival from Fink VOR "FNK" would be FNK2D

2. Published Waypoint with 5-character name, then if:

   a. No validity indicator or route indicator has been published, then retain the basic name as published.

   b. Only a validity indicator has been published, then retain the basic name and the validity indicator as published.

   c. Only a route indicator has been published, then retain the basic name and the route indicator as published.

   Examples:

   ALLAN Departure to ALLAN waypoint would be ALLAN
   CAROL One Departure to CAROL waypoint would be CAROL1
   STEVE Alpha Arrival from STEVE waypoint would be STEVEA

   d. Both a validity indicator and a route indicator have been published, then drop the last (5th) character of the basic name and retain the validity indicator and route indicator.

   Examples:

   DAVIS Five Bravo Departure to DAVIS waypoint would be DAVI5B
   ANITA Six Delta Arrival from ANITA waypoint would be ANIT6D

   e. The Waypoint name contains double letters and both validity indicator and route indicator are published, then drop the first double letter (instead of the 5th character of the waypoint name) and retain the validity indicator and route indicator.

   Examples:

   WITTY One Alpha Departure to WITTY waypoint would be WITY1A

   MASSA Two Charlie Arrival from MASSA waypoint would be MASA2C

3. Published Waypoint with more than 5 characters, then reduce the name to 5 characters using the established waypoint rules from this chapter and then apply rule B.2 above.

   Examples:

   COTTON One Departure to COTTON waypoint would be
   COTON1
   BURWELL Bravo Arrival from BURWELL waypoint would be BURWLB
   CLEAR LAKE Three Golf Departure to CLEAR LAKE waypoint would be CLAK3G

4. Published Duplicate Waypoint (as identified by WAYPOINT IDENTIFIERS - paragraph 7.2.3) then, drop the digit added to provide uniqueness (unless the digit is necessary because of the procedures existing at the same airport).

   Examples:

   CHARLIE Departure to a waypoint in the data base as CHAR1 or CHAR2 would be CHAR (retain only these four characters)
   CHARLIE One Departure to a waypoint in the data base as CHAR1 or CHAR2 would be CHAR1
   CHARLIE One Alpha Departure to a waypoint in the data base as CHAR1 or CHAR2 would be CHAR1A

   SHAWNEE Departure to a waypoint in the data base as SHA1E as there are more than nine points named SHAWNEE within the ICAO would be SHAE (as SHAE1 through SHAE9 came before SHA1E)
   SHAWNEE One BRAVO Departure to a waypoint in the data base as SHA1E as there are more than nine points named SHAWNEE within the ICAO would be SHAE1B.

5. Unpublished Waypoint name, then use the rule for the points as described in WAYPOINT IDENTIFIERS - paragraph 7.2.4 (unnamed waypoints), and apply the rule in B.2 above.

C. Unpublished SIDs or STARs without any name or identifier are currently not included in the aeronautical navigation data base and, hence, are not currently provided for in these naming rules for SID/STAR identifiers.

D. For "Engine Out SIDs," use an identifier provided by source documentation when such is available. If an Engine Out SID is to be coded that does not have a source provided identifier, an identifier will be created by adding the prefix "EO" to the Runway Designator. For example, an Engine Out SID for Runway 07L would be designated "EO07L." Note that with this convention, only one Engine Out SID per runway can be included in a master airline user file. c-1

7.5 Preferred Route Identifiers c-1

7.5.1 North American Routes

For North American Routes for North Atlantic Traffic, "Non-Common" portion and other Preferred or Preferential Routes without published identifiers but with unique initial and terminus fix points, the route identifier will be developed using the initial and terminus fix identifiers, as indicated in the table below.

Fix Type	Create Identifier Using
Airport Navaid Waypoint	Three or Four Character Airport Identifier Navaid Identifier Waypoint Identifier (five character max)

7.0 NAMING CONVENTIONS (cont'd)

7.5.1 North American Routes (cont'd)

Examples: From Airport to Airport - CYYLCYYC
From Airport to Navaid - CYYLART
From Navaid to Waypoint - ARTCOLAR

7.5.2 Multiple Routes - Same Fix

If there is more than one routing without a published identifier between the same to fixes and the rules in Section 7.5.1 is being used to create the route identifier, then add numerics to indicate the multiple routings.

Examples: For two routes between the airports CYYL and CYYC,
CYYLCYYC1 and CYYLCYYC2

7.5.3 Preferred or Preferential Routes

For Preferred or Preferential Routes without a published identifier and not between unique initial and terminus fix points but rather from areas or regions such as Terminal Control Areas, FIRs or Geographical Entities, the route identifier will be derived from commonly understood elements such as communications center identifiers, country or region abbreviations and the like. Note that if one end of the routing is a unique fix, the rules in Section 7.5.1 apply for that fix.

Area or Region	Create Identifier Using
FIR, ARTCC	Four Character ICAO Identifier of FIR or Center
Terminal Area	Three or Four Character Identifier of owning airport
Geographical Entity	Commonly used abbreviations
ICAO Region	Two character ICAO Region Code

c-13

Examples: From Terminal Area to Airport - CYULCYYC
From FIR to FIR - ENBOGCCC
From Center to Airport - KZTLKRDM
From Geographical Entity to Terminal Area SCANDIGCCC

7.5.4 Multiple Routes - Same Points/Areas/Regions

If there is more than one routing without a published identifier between the same two points/areas/regions and the rules in Section 7.5.3 is being used to create the route identifier, add numerics to indicate the multiples.

Examples: For two routes between KZTL and KRDM
KZTLKRDM1 and KZTLKRDM2

7.5.5 Preferred or Preferential Overfly Routings

For Preferred or Preferential Overfly Routings, routings that are not designed to serve a initial departing airport/terminal area or terminus arriving airport/terminal area, the route identifier will be derived from the fix, area or region to be overflown and a direction of overflight prefix or a direction of origin in reference to the direction of overflight suffix, according to the table below. If the route is an overflight route and no directional restrictions apply, the character "O" for "overfly" is used instead of the directional indication.

Fix/Area/ Region	Direction	Create Identifier Using
Airport		Three or 4-character Airport Identifier
Navaid		Navaid Identifier
Waypoint		Waypoint Identifier
FIR, ARTCC		Four Character FIR/Center ICAO Identifier
Terminal Area		Identifier of owning Airport
Geographical Entity		Commonly used abbreviations
ICAO Region		Two character ICAO Region Code
	North	The character "N"
	South	The character "S"
	East	The character "E"
	West	The character "W"
	Overfly	The character "O"

Note: The direction codes shown in the table are provided for guidance only. Any published direction may be indicated by the use of a 1, 2 or three character prefix/suffix.

Examples: c-1

Overflying Terminal Area Eastbound - ECYUL
Overflying FIR Southbound - SENBO
Overflying from West of a Center - KZTLW
Overflying Center Southwestbound - SWKZDV
Overflying Terminal Area (no direction specified) OEGLL

7.5.6 Multiple Routes - Overfly

If there is more than one routing without a published identifier between the fix/area/region and the rules in Section 7.5.5 are being used to create the identifier, add a numeric to indicate the multiples.

Examples: SENBO1 and SENBO2
OEGLL1,OEGLL2,0EGLL3

7.5.7 Preferred Weekday/Weekend

For Preferred or Preferential Routings that are published with a "weekday" and a "weekend" version, the rules for "multiples" are replaced with a two character suffix (replacing the numerics). "WK" is used for "weekday" and "WE" is used for "weekend." This rule applies to routes both with and without published identifiers.

Examples: Published Identifiers -
TOS1WK and TOS1WE

Unpublished Identifiers -
SENBOWK and SENBOWE

7.5.8 Weekday/Weekend

If there is more than one routing published as "weekday" or "weekend" and the rules in Section 7.5.7 are being used to create the identifier, add a numeric to indicate the multiples.

Examples: TOS1WK1 and TOS1WK2

7.5.9 Geographical Routings

For Preferred or Preferential Routings that are published as being between large areas not definable with aeronautical terms, a convention of Geographical Entity abbreviations is used to create Route Idents. As these Route Idents will have reduced the entity name down considerably, the Geographical Entity Reference Table is used to provide a link between the Route Ident and the full entity name. While the Route Ident is 10 characters long and normal split five and five between the initial and terminus points of the route, that split does not have to be applied when creating Route Idents based on Geographical Entities.

Examples: Routing between UK North and Greece West - UKNOGRECW or NOUKWGRECE

7.5.10 Multiple Routes - Geographical

c-13 If there is more than one routing without a published identifier between geographical entities and the rules in Sections 7.5.8 are being used to create the identifier, add a numeric to indicate the multiples.

Examples: UKNOGRECW1 and UKNOGRECW2

7.5.11 Off Load Route

For Preferred or Preferential Routings that are published with an "off load route," the rules for "multiples" are replaced with a three character suffix (replacing the numerics). "OLR" is used for the "off load route." The standard route would not use a suffix. This rule applies to routes both with and without published identifiers.

Examples: Published Identifiers - TOS1 and TOS1OLR

Unpublished Identifiers - SENBO and SENBOOLR

7.5.12 Multiple Routes - Off Load

If there is more than one routing published as "off load route" and the rules in Section 7.5.11 are being used to create the identifier, add a numeric to indicate the multiples.

Examples: SENBOOLR1 and SENBOOLR2

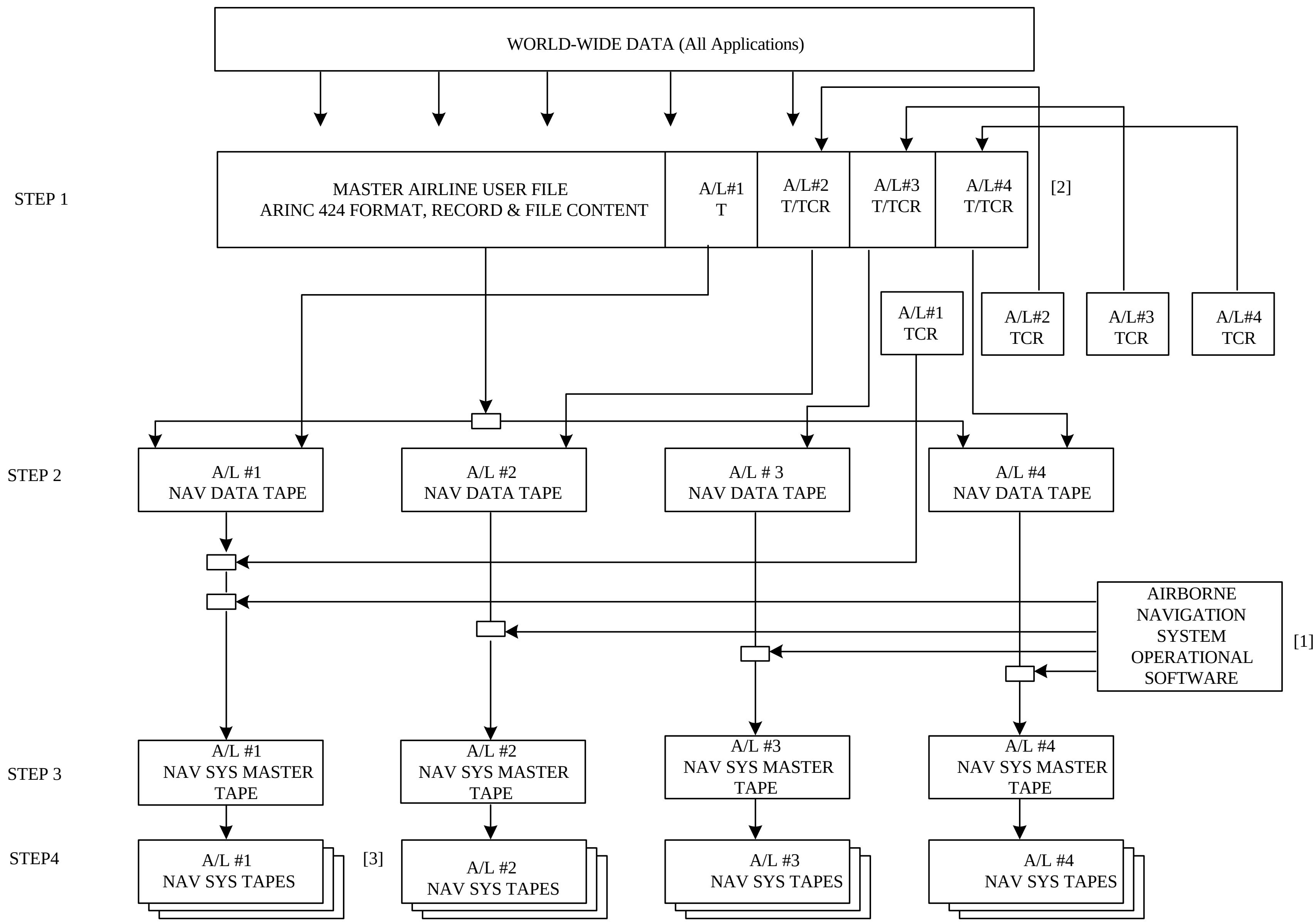
7.6 Transition Identifiers

c-10 SID/STAR Runway Transition Identifiers will be established using the characters RW (for runway) followed by the runway number. If a transition applies identically to parallel runways, the transition need only be coded once for the parallel runways. In those cases, it should be identified with a suffix of "B" after the runway number.

Example: Transitions for Runway 08L and 08R are identical. They can be coded once as RW08B rather than twice as RW08L and RW08R.

Approach Transition Identifiers are normally the identifier of the NAVAID or Waypoint at which the transition starts or as published in official government source. These identifiers may be modified to ensure a unique identifier is available for each transition.

ATTACHMENT 1
FLOW DIAGRAM



See next page for notes [1] thru [3]

ATTACHMENT 1 (cont'd)
FLOW DIAGRAM

Notes Concerning the Flow Diagram

1. The flow diagram shows alternate paths to individual airline FDSU master tapes for tailored company route (TCR) data.

2. Airline tailored records (denoted by the letter T in the individual airline boxes of the Step 1 level) will be formatted according to the standards set forth in this document.

3. Tapes are shown here as the airborne navigation system data storage media. Other media may be used in a given system. c-1

ATTACHMENT 2
LOCAL HORIZONTAL REFERENCE DATUM NAME, DATUM CODE, AND ELLIPSOID LIST

	Datum	Code	Ellipsoid
	Adindan	ADI	Clarke 1880
	Afgooye (Somalia)	AFG	Krassovsky
	AGD 1984	AGD	Australian National
	AGD 1966	AGE	Australian National
	Ain El Abd 1970 (Bahrain)	AIO	International
	Anna 1 Astro 1965 (Cocos Is.)	ANA	Australian National
	Austria NS	ANS	International
	Arc 1950, Africa	ARF	Clarke 1880
	Arc 1960	ARS	Clarke 1880
	Ascension Island 1958	ASC	International
	Astro Beacon "E" (Iwo Jima I.)	ASF	International
	Astro B4 Sorol Atoll (Tern I.)	ASG	International
	Astro DOS 71/4 (St. Helena I.)	ASH	International
	Astronomic Station 1952 (Marcus I.)	ASI	International
	Australian Geodetic	AUA	Australian National
	Djakarta (Batavia), Indonesia	BAT	Bessel 1841
	Belgium 1950	BEL	International
	Bermuda 1957	BER	Clarke 1866
c-12	Bogota Observatorio, Columbia	BOO	International
	Berne 1873	BRN	Bessel 1841
	Bukit Rimpah (Indonesia)	BUR	Bessel 1841
	Cape Canaveral	CAC	Clarke 1866
	Campo Inchauspe, Argentina	CAI	International
	Canton Island Astro 1966	CAO	International
	Cape	CAP	Clarke 1880
	Camp Area Astro	CAZ	International
	Carthage	CGE	Clarke 1880
	CH-1903	CHI	Bessel 1841
	Chatham Island Observatory, Port Blair, Andaman Is.	CHO	International
	Chua Astro	CHU	International
	Corrego Alegre, Brazil	COA	International
	Danish GI 1934	DGI	Danish
	Portuguese Datum DLX	DLX	Bessel 1841
	D.O.S. Astro GUX 1 (Guadacanal)	DOB	International
	DOS 1968	DOC	International
	Easter Island 1967	EAS	International
	Wake-Eniwetok, 1960	ENW	Hough

ATTACHMENT 2 (cont'd)
LOCAL HORIZONTAL REFRENCE DATUM NAME, DATUM CODE, AND ELLIPSOID LIST

Datum	Code	Ellipsoid
Afgooye (Somalia)	AFG	Krassovsky
European 1950	EUS	International
European 1979	EUT	International
Gandajika Base (Maldives)	GAN	International
Geodetic Datum 1949 (New Zealand)	GEO	International
GGRS 87 (Greece)	GRK	GRS 80
G. Segara (Indonesia)	GSE	Bessel 1841
Guam 1963	GUA	Clarke 1866
Herat North (Afghanistan)	HEN	International
Hito XVIII Astro, Chile	HIT	International
Hjorsey 1955, Iceland	HJO	International
Hong Kong 1963	HKD	International
Hu-Tzu-Shan, Taiwan	HTN	International
Nouvelle Triangulation de France (France)	IGF	Clarke 1880
Nouvelle Triangulation de France (Luxembourg)	IGL	International
Bellevue (IGN) Datum (New Herbrides Is.)	IGN	International
Indian	IND	Everest
Ireland 1965	IRL	Modified Airy
ISTS 073 Astro 1969	IST	International
Johnston Island 1961	JOH	International
Kertau 1948	KEA	Modified Everest
Kerguelen Island	KER	International
L.C. 5 Astro (Cayman Brac I.)	LCA	Clarke 1866
Liberia 1964 (Roberts Field Astro)	LIB	Clarke 1880
Luzon, Philippines	LUZ	Clarke 1866
Mahe 1971, Mahe Island	MAH	Clarke 1880
Marcus Astro 1961	MAR	International
Massawa, (Eritrea), Ethopia	MAS	Bessel 1841
Merchich, Morocco	MER	Clarke 1880
Midway Astro 1961	MID	International
Minna	MIN	Clarke 1880
Monavatu, Viti Levu I., Fiji Is.	MVS	Clarke 1880
Over Water Areas	N	International
Nahrwan	NAH	Clarke 1880

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ATTACHMENT 2 (cont'd)
LOCAL HORIZONTAL REFERENCE DATUM NAME, DATUM CODE, AND ELLIPSOID LIST

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Datum	Code	Ellipsoid
Naparima, BWI	NAP	International
North American 1927	NAS	Clarke 1866
North American 1927 Caribbean	NAT	Clarke 1866
North American 1927 Mexico and C. America	NAU	Clarke 1866
North American 1983	NAW	GRS-80 (WGS-84)
Netherlands Triangulation 1921	NTH	Bessel 1841
Observatorio 1966 (Corvo and Flores I, Azores)	OCF	International
Old Egyptian 1930	OEG	Helmert 1906
Ordanance Survey of Great Britain 1936	OGB	Airy
Old Hawaiian	OHA	Clarke 1866
Oman	OMA	Clarke 1880
Kandawala Datum (Sri Lanka)	PIE	Everest
Pitcairn Astro 1967	PIT	International
Pico de las Nieves, Gran Canaria	PLN	International
Postdam	POT	Bessel
Provisional Chilean 1963	PRC	International
Portuguese Datum 1973	PRD	International
Provisional South American 1956	PRP	International
Puerto Rico	PUR	Clarke 1866
Qatar National Datum	QAT	International
Qornoq, Greenland	QUO	International
Reunion (Mascarene I.)	REU	International
RNB 72 (Belgium)	RNB	International
Rome 1940	ROM	International
South American 1969	SAD	South American 1969
Santo DOS (Espirito Santo I.)	SAN	International
Sao Braz, Sao Miguel and Santa Maria, Azores	SAO	International

ATTACHMENT 2 (cont'd)
LOCAL HORIZONTAL REFRENCE DATUM NAME, DATUM CODE, AND ELLIPSOID LIST

Datum	Code	Ellipsoid
Sapper Hill 1943	SAP	International
Schwarzeck, Southwest Africa	SCK	Bessel 1841
Southeast Base (Maderia and Porto Santo)	SEB	International
South Asia Datum	SOA	Modified Fischer 1960
RT90 (Sweden)	STO	Bessel 1841
S.W. Base (Azores)	SWB	International
Tananarive Observatory 1925, Madagascar	TAN	International
Timbalai 1948, Borneo	TIL	Everest
Tokyo	TOK	Bessel 1841
Tristan Astro 1968 (Tristan da Cunha)	TRS	International
Unknown	U	(International)
World Geodetic System 1960	WGA	WGS-60
World Geodetic System 1966	WGB	WGS-66
World Geodetic System 1972	WGC	WGS-72
World Geodetic System 1984	WGE	WGS-84 (GRS-80)
Yacare, Uraguay	YAC	International
Zanderij	ZAN	International

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ATTACHMENT 2 (cont'd)
LOCAL HORIZONTAL REFERENCE DATUM NAME, DATUM CODE, AND ELLIPSOID LIST

NOTE: This listing does not include the name of the ellipsoid used with the local datum as that information is not currently available.

Datum	Code	Ellipsoid
La Canoa	LAC	
Lee No. 7	LEE	
Lemuta Samoa Islands	LEM	
Local (Local Astro)	LOC	
Manira	MAQ	
Marco Astro (Salvage I.)	MAT	
Masira Island Astro 1958	MAU	
Marcus Astro 1965	MAX	
McMurdo Camp Area, Antarctica	MCM	
Manchurian Principal System	MCN	
Mercury (Fischer 1960)	MET	
Montjong Lowe (Indonesia)	MOL	
Modified Mercury (Fischer 1968)	MOT	
Mozambique	MOZ	
Nanking 1960	NAN	
Nigeria	NIG	
Nikolskoe Astro 1929	NIL	
NMA/539 Wilkes Station, Antarctica	NMW	
North Astro 1947	NOT	
Paga Hill 1939, New Guinea	PAH	
Palmer Astro	PAM	
Pete Astro 1969	PET	
Pico Norte	PIC	
Pidurutal Agala, Ceylon (Sri Lanka)	PID	
Pulkovo 1932 System, USSR	PKO	
Ponape Astro 1962	PON	
Port Lockroy	POR	
Pronto Socorro, Brazil	PRS	
Pico de Sao Tome, Sao Tome I.	PST	
Pulkovo 1942 System, USSR	PUK	
Reykjavik, Iceland	REY	
Southeast Island, Seychelles	SEI	
Sierra Leone 1960	SIB	
Spitzbergen (Norway)	SPZ	
Stockholm, Sweden	STO	
Sydney Observatory, New South Wales, Australia	SYP	
Table Hill	TAH	
Taongi Astro 1952	TAO	
Trinidad Trigonometrical Survey, Lesser Antilles	TRI	
Tsingtao Observatory, China	TSO	
Vaitape Flagstaff, Borabora I., Society Is.	VBS	
Voirol, Algeria	VOI	
Wake Island Astro 1952	WAK	
Yof Astro 1967	YOF	

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ATTACHMENT 2 (cont'd)
LOCAL HORIZONTAL REFRENCE DATUM NAME, DATUM CODE, AND ELLIPSOID LIST

The following is a listing of ellipsoids that have been identified as being used with Local Horizontal Reference Datums.

ELLIPSOID NAME LIST

Ellipsoid Name

Airy 1948
Aust. National 1965
Bessel 1841
Clarke 1866
Clarke 1880
Everest 1830
Fischer 1960
Fischer 1968
GRS 67
GRS 72
GRS 80
Helmert 1906
Hough
International
Krassovsky 1942
Modified Airy
Modified Clarke 1880
Modified Everest
Modified Fischer 1960
South American 1969
Struve 1860
WGS 84

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

The following pages show a sample computer printout of an ARINC 424 data file. Each record type currently available in an ARINC 424 file is included. Relationships between various record types within the data file has been maintained, e.g., the Navaids and Waypoints used on the Enroute Airways are available in the appropriate Sections/Subsections.

MINIMUM OFF ROUTE ALTITUDE (MORA) (AS)

S	AS	N36W120	105168135095143104104116112105122117107139155116111073052046046034030033037035038030027023	000018708
S	AS	N36W150	010010010010010010010010010010010010010010010010010010010010010010010010010010010022082076	000028508
S	AS	N37W120	155166129118118117127137131137137165166164167160095075053049041037037037037032031047031033	000038902
S	AS	N37W150	010010010010010010010010010010010010010010010010010010010010010010010010010010020046057082	000048508
S	AS	N38W120	148136141143139154121145140139151129167168165147084072053045040041042032028030028031026028	000058708
S	AS	N38W150	010010010010010010010010010010010010010010010010010010010010010010010010010010046071036127	000068508
S	AS	N39W120	131111138129131144144124143125119132165168166117086074057049042036031037037032025029030023	000078708
S	AS	N39W150	010010010010010010010010010010010010010010010010010010010010010010010010010034090098095116	000088508
S	AS	N40W120	113122121120137128109134141159146120147146166089078059050046046044042031028028027032023024	000098708
S	AS	N40W150	010010010010010010010010010010010010010010010010010010010010010010010010010054113109128103	000108508
S	AS	N41W120	109117121127132131123117123121119119134144120091079060056049045041049039040031041026034032	000118708
S	AS	N41W150	010010010010010010010010010010010010010010010010010010010010010010010010010041113165104122	000128708

CRUISING TABLE (TC)

S	TCA01	36001790M	0200002000280002800003000310003100004000UNLTD	000358706
S	TCA02	18003590M	0100002000290002900004000UNLTD	000368706
S	TCA11	36003590M	290000200043000	000378810
S	TCA21	36003590M	280000200042000	000388810
S	TCA31	36001790M	300000200040000	000398810
S	TCA32	18003590M	290000200041000	000408810
S	TCAA1	36001790M	0100002000290002900004000UNLTD	000418706
S	TCAA2	18003590M	0200002000280002800003000310003100004000UNLTD	000428706
S	TCBB1	03002090M	0100002000290002900004000UNLTD	000438810
S	TCBB2	21000290M	0200002000280002800003000310003100004000UNLTD	000448903
S	TCC11	36000890M	0100002000290003300004000UNLTD	000458810
S	TCC12	09001790M	0150002000275003000004000UNLTD	000468810
S	TCC13	18002690M	0200002000280003100004000UNLTD	000478810
S	TCC14	27003590M	0250002000285003200004000UNLTD	000488810
S	TCCC1	36001790M	0100002000290002900004000UNLTD	000498810
S	TCCC2	18003590M	0200002000280002800003000310003100004000UNLTD	000508810

VHF NAVAID (D)
(With Simulation and Flight Planning Continuations)

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SUSAD   ACV  K2111020VDTA N40585370W124062570    N40585370W124062570E0170001910  256NASARCATA                015638502
SUSAD   ACV  K22 TB030100+0400008100040                                                                      015648502
SUSAD   ACV  K23PKZSEKZSE                                                                                    015658613
SUSAD   ACV  K24S    UY                                      E017500191                                      015668502
SUSAD   AHC  K2110900VDTW N40160466W120090328    N40160466W120090328E0170040080  206NASAMEDEE (HERLONG)      015678811
SUSAD   AHC  K22PKZOAKZOA                                                                                    015698613
SUSAD   AHC  K23S    UN                                      E016604008                                      015708201
SUSAD   ALW  K1111640VDLA N46051360W118172930    N46051360W118172930E0200011501     NASWALLA WALLA           015718413
SUSAD   ALW  K12PKZSEKZSE                                                                                    015738613
SUSAD   ALW  K13S    UY                                      E018401150                                      015748413
SUSAD   AST  K1111400VDLA N46094270W123524480    N46094270W123524480E0190000101  330NASASTORIA               015758809
SUSAD   AST  K12PKZSEKZSE                                                                                    015778613
SUSAD   AST  K13S    UY                                      E019700010                                      015788406
SUSAD   AVE  K2111710VTH  N35384925W119583948    N35384925W119583948E0160007102  567NASAVENAL                015798401
SUSAD   AVE  K22PKZLAKZLA                                                                                    015818613
SUSAD   AVE  K23S    UY                                      E015000710                                      015828401
SUSAD   BTG  K1111660VTHA N45445270W122352520    N45445270W122352520E0210002502  451NASBATTLE GROUND         015998801
SUSAD   BTG  K12PKZSEKZSE                                                                                    016018801
SUSAD   BTG  K13S    UY                                      E019300250                                      016028801
SUSAD   ELN  K1111790VTHA N47012830W120272620    N47012830W120272620E0210017702  451NASELLENSBURG            016398304
SUSAD   ELN  K12PKZSEKZSE                                                                                    016418613
SUSAD   ELN  K13S    UY                                      E019401770                                      016428304
SUSAD   ENI  K2111230VTHA N39031200W123162310    N39031200W123162310E0160029802  411NASMENDOCINO             016438807
SUSAD   ENI  K22PKZOAKZOA                                                                                    016458613
SUSAD   ENI  K23S    UY                                      E016702980                                      016468409
SUSAD   EPH  K1111260VTHA N47224100W119252230    N47224100W119252230E0210012502  394NASEPHRATA               016478411
SUSAD   EPH  K12PKZSEKZSE                                                                                    016498613
SUSAD   EPH  K13S    UY                                      E019301250                                      016508411
SUSAD   MOD  K2111460VDH  N37373880W120572460    N37373880W120572460E0170000902  571NASMODESTO               017398608
SUSAD   MOD  K22PKZOAKZOA                                                                                    017418613
SUSAD   MOD  K23S    UY                                      E015800090                                      017428608
SUSAD   MVA  K2111510VTHA N38335535W118015484    N38335535W118015484E0170078602  476NASMINA                  017438306
SUSAD   MVA  K22PKZOAKZOA                                                                                    017458613
SUSAD   MVA  K23S    UY                                      E015507860                                      017468306
SUSAD   NUQ  K2111760 TL                     NUQ N37255680W122032320E0170000041  314NASNAVY MOFFETT FIELD    017758806
SUSAD   NUQ  K22PKZOAKZOA                                                                                    017778806
SUSAD   NUQ  K23S    UY                                      E0159                                           017788806
SUSAD   NUW  K1111380 TH                     NUW N48211838W122393600E0200000502  325NASNAVY WHIDBEY ISLAND   017798806
SUSAD   NUW  K12PKZSEKZSE                                                                                    017818806
SUSAD   NUW  K13S    UY                                      E0205                                           017828806
SUSAD   OAK  K2111680VTH  N37433360W122132100    N37433360W122132100E0170000103  477NASOAKLAND               017838110
SUSAD   OAK  K22PKZOAKZOA                                                                                    017858613
SUSAD   OAK  K23S    UY                                      E016000010                                      017868110
SUSAD   OED  K1111360VTHA N42284710W122544250    N42284710W122544250E0190020802  410NASMEDFORD               017918411
SUSAD   OED  K12PKZSEKZSE                                                                                    017938613
SUSAD   OED  K13S    UY                                      E017902080                                      017948411
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VHF NAVAID (D)
(With Simulation and Flight Planning Continuations)
(Continued)

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SUSAD        UBG   K1111740VTHA N45211220W122583700    N45211220W122583700E0210014402  493NASNEWBERG                  019078110
SUSAD        UBG   K12PKZSEKZSE                                                                                       019098613
SUSAD        UBG   K13S    UY                                         E019101440                                      019108110
SUSAD        YKM   K1111600VTHA N46341350W120263640    N46341350W120263640E0210009802  525NASYAKIMA                   019158502
SUSAD        YKM   K12PKZSEKZSE                                                                                       019178613
SUSAD        YKM   K13S    UY                                         E019200980                                      019188502
SUSAD KSEAK1 ISZI  K1111170 IT                       ISZIN47260947W122183980    003660  588NASSEATTLE-TACOMA INTL     019588808
SUSAD KSEAK1 ISZI  K12PKZSEKZSE                                                                                       019598713
SUSAD KSEAK1 ISZI  K13S    UN  L                                      E020000366                                      019608901
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NDB NAVAID (DB)
(With Simulation and Flight Planning Continuations)

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SUSADB       ARU   K2102150H MW N41281600W120332500                   E0180           NASALTURAS                      019768110
SUSADB       ARU   K22S      U21                                                                                      019788110
SUSADB       ARU   K23PKZSEKZSE                                                                                       019798110
SUSADB       CAN   K1102740H MW N47243880W122501510                   E0200           NASCARNEY (BREMERTON)           019848308
SUSADB       CAN   K12S      U21                                                                                      019868308
SUSADB       CAN   K13PKZSEKZSE                                                                                       019878308
SUSADB       CC    K2103350HOMW N38024740W122015640                   E0170           NASKANAN                        019888807
SUSADB       CC    K22S      U21                                                                                      019908807
SUSADB       CC    K23PKZOAKZOA                                                                                       019918807
SUSADB       F     K2103140H  W N37415400W123001200                   E0170           NASFARALLON ISLAND              020088110
SUSADB       F     K22S      U21                                                                                      020108110
SUSADB       F     K23PKZOAKZOA                                                                                       020118110
SUSADB       MOG   K2103820H  A N41433840W122285050                   E0200           NASMONTAGUE                     020768110
SUSADB       MOG   K22S      U21                                          02620                                       020788110
SUSADB       MOG   K23PKZSEKZSE                                                                                       020798110
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ENROUTE WAYPOINT (EA)
(With Flight Planning Continuations)

SUSAEAENRT	26FLW K21 I D	N36442340W121282270	E0156	NAS	B	FLW306/D126	021528110
SUSAEAENRT	26FLW K22PKZOAKZOA						021538701
SUSAEAENRT	ALFOR K11 R F L	N44183310W123090510	E0187	NAS	P	ALFOR	021648207
SUSAEAENRT	ALFOR K12PKZSEKZSE						021658613
SUSAEAENRT	ALTAM K21 R Z L	N37484410W121444580	E0160	NAS	P	ALTAM	021668613
SUSAEAENRT	ALTAM K22PKZOAKZOA						021678701
SUSAEAENRT	BRINY K21 RF L	N37181740W122393800	E0159	NAS	P	BRINY	022408303
SUSAEAENRT	BRINY K22PKZOAKZOA						022418701
SUSAEAENRT	BTG32 K11 I L	N45335140W121524960	E0190	NAS	B	BTG089/DLS234	022488802
SUSAEAENRT	BTG32 K12PKZSEKZSE						022498802
SUSAEAENRT	BTG51 K11 I L	N44522830W122361410	E0189	NAS	B	BTG160/EUG010	022508802
SUSAEAENRT	BTG51 K12PKZSEKZSE						022518802
SUSAEAENRT	LOFAL K11 R Z L	N47503790W122401980	E0203	NAS	P	LOFAL	025738409
SUSAEAENRT	LOFAL K12PKZSEKZSE						025748613
SUSAEAENRT	MOGNB K21 N B	N41433840W122285050	E0175	NAS	Q	MONTAGUE	026278110
SUSAEAENRT	MOGNB K22PKZOAKZOA						023858613
SUSAEAENRT	ODESS K11 R Z H	N47081310W117582330	E0188	NAS	P	ODESS	026708304
SUSAEAENRT	ODESS K12PKZSEKZSE						026718613
SUSAEAENRT	SHOEY K21 R Z L	N36444462W122075863	E0157	NAS	P	SHOEY	028438904
SUSAEAENRT	SHOEY K22PKZOAKZOA						028448701

ENROUTE MARKER (EM)

SUSAEM	K101	K10.-.	EL	N46123100W1235751001290	E0210	NAS	FORT STEVENS	029988706
SUSAEM	K104	K10.-.	EL	N43072800W1232054101770	E0200	NAS	WINSTON	029998613

HOLDING (EP)

SUSAEPENRT	10AVE K2D 01300R	1518000FL450		AVENAL	030038904
SUSAEPENRT	10ODESSK1EA02530R	10	17999	ODESS	030048904
SUSAEPENRT	20ALTAMK2EA01770L	100500017999160		ALTAM	030058904
SUSAEPENRT	20BTG K1D 01490R	10	17999	BATTLE GROUND	030068904
SUSAEPENRT	20OED K1D 03370R	10	17999	MEDFORD	030078904
SUSAEPENRT	20UBG K1D 00030L	10	17999	NEWBERG	030088904
SUSAEPENRT	21BRINYK2EA00570R	10	17999	BRINY	030098904
SUSAEPENRT	22BRINYK2EA02370R	10	17999	BRINY	030108904
SUSAEPENRT	30EPH K1D 02460R	10	17999	EPHRATA	030118904
SUSAEPENRT	40EPH K1D 02460R	10	17999	EPHRATA	030128904
SUSAEPENRT	40UBG K1D 00030L	10	17999	NEWBERG	030148904
SUSAEPENRT	50MOD K2D 02440L	10	17999	MODESTO	030158904
SUSAEPENRT	50ELN K1D 02500R	10	17999	ELLENSBURG	030168904
SUSAEPKSEAK1	40FINNYK1PC00230R	0500150009000150		FINNY	030178904
SUSAEPKSEAK1	50FINNYK1PC00230R	0500150009000150		FINNY	030188904

ENROUTE AIRWAY (ER)

SUSAER	C1415	0010FOT K2D OV	CB AA	252012400000	UNKNN	FL450	030308803
SUSAER	C1415	0020REDOOK2EA0EEC	CB	000000002510			030318702
SUSAER	C1416	0010FOT K2D OV	CB AA	305013300000	UNKNN	FL450	030328704
SUSAER	C1416	0020DAASHK2EA0EEC	CB	000000003050			030338902
SUSAER	C1418	0010HQM K1D OV	CB AA	210013800000	UNKNN	FL450	030348704
SUSAER	C1418	0020SEDARK1EA0EEC	CB	000000002100			030358110
SUSAER	C1419	0010ONP K1D OV	CB AA	216013700000	UNKNN	FL450	030368704
SUSAER	C1419	0020HEMLOK1EA0EEC	CB	000000002160			030378110
SUSAER	C1486	0010ENI K2D OV C	CB AA	285019600000	UNKNN	FL450	030388803
SUSAER	C1486	0020REDOOK2EA0EEC	CB	000000002850			030398803
SUSAER	J1	0570OAK K2D OV C	OH AA	343014203010	1800022000FL450		030408704
SUSAER	J1	0580RBL K2D OV C	OH AA	330014603420	1800022000FL450		030418704
SUSAER	J1	0590OED K1D OV C	OH AA	345019703290	1800022000FL450		030428704
SUSAER	J1	0600BTG K1D OV	OH AA	345006503430	1800022000FL450		030438801
SUSAER	J1	0610ALDERK1EA0T H	OH AA	345003703450	1800022000FL450		030448704
SUSAER	J1	0620SEA K1D OVEC	OH	000000003450			030458207
SUSAER	J110	0010OAK K2D OV C	OH AA	138007000000	18000	FL450	030468704
SUSAER	J110	0030SNS K2D OV	OH AA	064008801380	18000	FL450	030478704
SUSAER	J110	0040CZQ K2D OV C	OH AA	086002600670	24000	FL450	030488704
SUSAER	J110	0050PINNIK2EA0E	OH AA	086003400860	24000	FL450	030498704
SUSAER	J110	0055MITELK2EA0R	OH AA	086011700860	24000	FL450	030508704
SUSAER	J20	0210PDT K1D OV C	OH AA	290008202750	18000	FL450	030828704
SUSAER	J20	0220YKM K1D OV	OH AAY	284005402880	18000	FL450	030838704
SUSAER	J20	0225RADDYK1EA0R H	OH AAY	281003902840	18000	FL450	030848704
SUSAER	J20	0230SEA K1D OVEC	OH	000000002810			030858110
SUSAER	J3	0010OAK K2D OV C	OH AA	343014200000	18000	FL450	030868704
SUSAER	J3	0020RBL K2D OV C	OH AAY	010016303420	18000	FL450	030878704
SUSAER	J3	0030LKV K1D OV C	OH AAY	356013400100	18000	FL450	030888704
SUSAER	J3	0040IMB K1D OV C	OH AA	006019503550	18000	FL450	030898704
SUSAER	V105	0220YERINK2EA0E	OL AA	299003102990	10000	17999	031678704
SUSAER	V105	0230CHIMEK2EA0E	OL AA	299001502990	10000	17999	031688704
SUSAER	V105	0240FMG K2D OVEC	OL	000000002990			031698603
SUSAER	V107	0120CITIEK2EA0R	OL AA	313002003130	07000	17999	031708704
SUSAER	V107	0130PXN K2D OV C	OL AA	296003403130	07000	17999	031718704
SUSAER	V107	0140CATHEK2EA0E	OL AA	296002602960	07000	17999	031728704
SUSAER	V107	0150VINCOK2EA0R	OL AA	294000502940	06000	17999	031738704
SUSAER	V107	0160MABRYK2EA0R	OL AA	294000602940	05500	17999	031748704
SUSAER	V107	0170MISONK2EA0T	OL AA	294000502940	04500	17999	031758704
SUSAER	V107	0180IMPLYK2EA0T	OL AA	294000502940	04500	17999	031768704
SUSAER	V107	0190DECOTK2EA0T	OL AA	294001102940	04500	17999	031778704
SUSAER	V107	0200OAK K2D OV C	OL AA	288001602940	05000	17999	031788704
SUSAER	V107	0210COMMOK2EA0E	OL AA	288000802880	05000	17999	031798704
SUSAER	V107	0220MICRAK2EA0T	OL AA	288001302880	05000	17999	031808704
SUSAER	V107	0230PYE K2D OV C	OL AA	289001502880	05000	17999	031818704
SUSAER	V107	0240BOARSK2EA0EE	OL	000000002890			031828206

ENROUTE AIRWAY (ER)
(Continued)

```
SUSAER     V108      0050STS  K2D OV     OL AA          118002900000 04500     17999              031838704
SUSAER     V108      0060SGD  K2D OV     OL AA          114001101170 03000     17999              031848704
SUSAER     V108      0070CROITK2EA0E     OL AA          079000701140 03000     17999              031858704
SUSAER     V108      0080CCR  K2D OV     OL AA          071000700790 03000     17999              031868704
SUSAER     V108      0090PITTSK2EA0E     OL AA          071001100710 03500     17999              031878902
SUSAER     V108      0100OAKEYK2EA0E     OL AA          071001600710 02000     17999              031888902
SUSAER     V108      0110LODDIK2EA0E     OL AA          071001500710 02000     17999              031898704
SUSAER     V108      0120LIN  K2D OVEC   OL             000000000710                                031908110
```

ENROUTE AIRWAY RESTRICTION RECORD (EU)

```
SUSAEUJ20   001TCOYKM  K1D SEA  K1D 31JAN9031MAR90CS1707001700                  A0               031918913
SUSAEUJ3    001NR1RBL  K2D IMB  K1D 01JAN9031DEC90AVBL ONE WAY RBL TO IMB DURING LAKEVIEW AFB     031928913
SUSAEUJ3    001NR2                         MORNING AND EVENING SCRAMBLE ACTIVITY                 031938913
```

ENROUTE COMMUNICATIONS (EV)

```
SUSAEVALW    MOSES LAKE           FSS0012240 V1  R A N47123960W119185640E0193     Y                        039188810
SUSAEVALW    MOSES LAKE           FSS0012240 V2                                     WALLA WALLA            039198810
SUSAEVALW    MOSES LAKE           TWE0011500 V1    A N47123960W119185640E021001177Y             MWH K1D    039208810
SUSAEVALW    MOSES LAKE           TWE0011500 V2                                                            039218810
SUSAEVKZSEZRFTHE DALLES           ACC0011965 V1 DGRA N45425000W121055900E0190     Y                        041568810
SUSAEVKZSEZRFTHE DALLES           ACC0011965 V2                                     SEATTLE                041578810
SUSAEVKZSEZRFYAKIMA               ACC0012030 V1  GRA N46314000W120304600E0192     Y                        041628810
SUSAEVKZSEZRFYAKIMA               ACC0012030 V2                                     SEATTLE                041638810
SUSAEVKZSEZRFYAKIMA               ACC0013260 V1 DGRA N46314000W120304600E0192     Y                        041648810
SUSAEVKZSEZRFYAKIMA               ACC0013260 V2                                     SEATTLE                041658810
SUSAEVKZSEZRUYAKIMA               ACC0012030 V1  GRA N46314000W120304600E0192     Y                        041948810
SUSAEVKZSEZRUYAKIMA               ACC0012030 V2                                     SEATTLE                041958810
SUSAEVKZSEZRUYAKIMA               ACC0013475 V1  GRA N46314000W120304600E0192     Y                        041968810
SUSAEVKZSEZRUYAKIMA               ACC0013475 V2                                     SEATTLE                041978810
SUSAEVSEA    THE DALLES           FSS0012200 V1E R A N45425000W121055900E021003220N             DLS K1D    045168810
SUSAEVSEA    THE DALLES           FSS0012200 V2 H  1507002300                       SEATTLE                045178810
SUSAEVSEA    THE DALLES           FSS0012265 V1  R A N45425000W121055900E021003220Y             DLS K1D    045188810
SUSAEVSEA    THE DALLES           FSS0012265 V2                                     SEATTLE                045198810
SUSAEVSEA    THE DALLES           TWE0011230 V1    A N45425000W121055900E021003220N             DLS K1D    045208810
SUSAEVSEA    THE DALLES           TWE0011230 V2 N                                                          045218810
USUAEVSEA    THE DALLAS           TWE0011230 V3    SPRING AND FALL PERIODS ONLY                            045228810
SUSAEVSEA    YAKIMA               FSS0012250 V1  R A N46313300W120315200E0192     Y                        045288810
SUSAEVSEA    YAKIMA               FSS0012250 V2                                     SEATTLE                045298810
SUSAEVSEA    YAKIMA               TWE0011600 V1    A N46341350W120263640E021000980N             YKM K1D    045308810
SUSAEVSEA    YAKIMA               TWE0011600 V2                                                            045318810
```

HELIPORT (HA)
(With Flight Planning Continuations)

```
SUSAH KKENK1AKAHHEL01110000NASY N47440610W122153300E019300996250SEA K11800018000CU00Y050100  KENMORE AIR TERMINAL   045328807
SUSAH KKENK1AKAH     2PKZSEKZSE                                                                                  045338807
```

HELIPORT COMMUNICATIONS (HV)

```
SUSAP KKENK1VTWR0011990 V0    A N47265700W122182910E019900429Y                00      KENMORE              045348810
SUSAP KKENK1VUNI0012295 V0    A N47265700W122182910E019900429Y                00      KENMORE TERMINAL     045358811
```

AIRPORT (PA)
(With Flight Planning Continuations)

```
SUSAP KSEAK1ASEA      110000119Y N47265700W122182910E019900429250SEA K11800018000CU00Y NAS    SEATTLE-TACOMA INTL   045698808
SUSAP KSEAK1ASEA      2PKZSEKZSE                                                                                  045718808
```

TERMINAL WAYPOINT (PC)
(With Flight Planning Continuations)

```
SUSAP KSEAK1CANVIL K11     RCF   N47370820W122183010          E0201          P  ANVIL              045728804
SUSAP KSEAK1CANVIL K12PKZSEKZSE                                                                    045738613
SUSAP KSEAK1CBEAVR K11     R D   N44371085W122183020          E0201          P  BEAVR              045748803
SUSAP KSEAK1CBEAVR K12PKZSEKZSE                                                                    045758613
SUSAP KSEAK1CBISSL K11     R E   N47103130W121315750          E0197          P  BISSL              045768304
SUSAP KSEAK1CBISSL K12PKZSEKZSE                                                                    045778613
SUSAP KSEAK1CDONDO K11     O F   N47215090W122182790          E0200           O OM RW34R DONDO     045788110
SUSAP KSEAK1CDONDO K12PKZSEKZSE                                                                    045798613
SUSAP KSEAK1CFACTS K11     R Z   N47090850W122183020          E0199          P  FACTS              045808304
SUSAP KSEAK1CFACTS K12PKZSEKZSE                                                                    045818613
SUSAP KSEAK1CFF16L K11     IAF   N47315580W122183020          E0201          T  SEA338/D5.8        045828804
SUSAP KSEAK1CFF16L K12PKZSEKZSE                                                                    045838613
SUSAP KSEAK1CFF34L K11     IAF   N47215010W122183020          E0200          T  SEA158/D4.3        045848804
SUSAP KSEAK1CFF34L K12PKZSEKZSE                                                                    045858613
SUSAP KSEAK1CFINNY K11     R E   N46374050W122183020          E0196          P  FINNY              045868304
SUSAP KSEAK1CFINNY K12PKZSEKZSE                                                                    045878613
SUSAP KSEAK1CGRAME K11     R E   N46560520W122183020          E0198          P  GRAME              045888304
SUSAP KSEAK1CGRAME K12PKZSEKZSE                                                                    045898613
SUSAP KSEAK1CMILLT K11     RCF   N47150990W122183020          E0199          P  MILLT              045908804
SUSAP KSEAK1CMILLT K12PKZSEKZSE                                                                    045918613
SUSAP KSEAK1CPARKK K11     RAF   N47315720W122182060          E0201          P  PARKK              045928804
SUSAP KSEAK1CPARKK K12PKZSEKZSE                                                                    045938613
SUSAP KSEAK1CTHUNN K11     R E   N47060860W122183020          E0198          P  THUNN              045948811
SUSAP KSEAK1CTHUNN K12PKZSEKZSE                                                                    045958613
```

STANDARD INSTRUMENT DEPARTURES (SIDs) (PD)
(With Flight Planning Continuations)

SUSAP	KSEAK1DMOUNT12ALL	010ELN K1D 1VE	IF		18000	045968507
SUSAP	KSEAK1DMOUNT12ALL	010ELN K1D 2P		0000		045978801
SUSAP	KSEAK1DMOUNT13GEG	010ELN K1D 1V	IF		18000	045988507
SUSAP	KSEAK1DMOUNT13GEG	010ELN K1D 2P		0000		045998801
SUSAP	KSEAK1DMOUNT13GEG	020HAMURK1EA1E	TF			046008413
SUSAP	KSEAK1DMOUNT13GEG	020HAMURK1EA2P		0630		046018613
SUSAP	KSEAK1DMOUNT13GEG	030GEG K1D 1VE	TF			046028413
SUSAP	KSEAK1DMOUNT13GEG	030GEG K1D 2P		0630		046038613
SUSAP	KSEAK1DMOUNT13MLP	010ELN K1D 1V	IF		18000	046048507
SUSAP	KSEAK1DMOUNT13MLP	010ELN K1D 2P		0000		046058801
SUSAP	KSEAK1DMOUNT13MLP	020HAMURK1EA1E	TF			046068413
SUSAP	KSEAK1DMOUNT13MLP	020HAMURK1EA2P		0630		046078613
SUSAP	KSEAK1DMOUNT13MLP	030ODESSK1EA1E	TF			046088413
SUSAP	KSEAK1DMOUNT13MLP	030ODESSK1EA2P		0400		046098613
SUSAP	KSEAK1DMOUNT13MLP	040MLP K1D 1VE	TF			046108413
SUSAP	KSEAK1DMOUNT13MLP	040MLP K1D 2P		0970		046118613
SUSAP	KSEAK1DMOUNT13ODESS	010ELN K1D 1V	IF		18000	046128507
SUSAP	KSEAK1DMOUNT13ODESS	010ELN K1D 2P		0000		046138801
SUSAP	KSEAK1DMOUNT13ODESS	020HAMURK1EA1E	TF			046148413
SUSAP	KSEAK1DMOUNT13ODESS	020HAMURK1EA2P		0630		046158613
SUSAP	KSEAK1DMOUNT13ODESS	030ODESSK1EA1EE	TF			046168413
SUSAP	KSEAK1DMOUNT13ODESS	030ODESSK1EA2P		0400		046178613

STANDARD INSTRUMENT ARRIVALS (STARs) (PE)
(With Flight Planning Continuations)

```
SUSAP KSEAK1EELN2  1GEG   010GEG  K1D 1V       IF                                 18000                 046328508
SUSAP KSEAK1EELN2  1GEG   010GEG  K1D 2P                          0000                                  046338804
SUSAP KSEAK1EELN2  1GEG   020HAMURK1EA1E       TF                                                       046348508
SUSAP KSEAK1EELN2  1GEG   020HAMURK1EA2P                          0630                                  046358613
SUSAP KSEAK1EELN2  1GEG   030ELN  K1D 1VE H    TF                                                       046368508
SUSAP KSEAK1EELN2  1GEG   030ELN  K1D 2P                          0630                                  046378613
SUSAP KSEAK1EELN2  1HAMUR 010HAMURK1EA1E       IF                                 18000                 046388508
SUSAP KSEAK1EELN2  1HAMUR 010HAMURK1EA2P                          0000                                  046398804
SUSAP KSEAK1EELN2  1HAMUR 020ELN  K1D 1VE H    TF                                                       046408508
SUSAP KSEAK1EELN2  1HAMUR 020ELN  K1D 2P                          0630                                  046418613
SUSAP KSEAK1EELN2  1MLP   010MLP  K1D 1V       IF                                 18000                 046428508
SUSAP KSEAK1EELN2  1MLP   010MLP  K1D 2P                          0000                                  046438804
SUSAP KSEAK1EELN2  1MLP   020ODESSK1EA1E  H    TF                                                       046448613
SUSAP KSEAK1EELN2  1MLP   020ODESSK1EA2P                          0970                                  046458613
SUSAP KSEAK1EELN2  1MLP   030HAMURK1EA1E       TF                                                       046468508
SUSAP KSEAK1EELN2  1MLP   030HAMURK1EA2P                          0400                                  046478613
SUSAP KSEAK1EELN2  1MLP   040ELN  K1D 1VE H    TF                                                       046488508
SUSAP KSEAK1EELN2  1MLP   040ELN  K1D 2P                          0630                                  046498613
SUSAP KSEAK1EELN2  1ODESS 010ODESSK1EA1E  H    IF                                 18000                 046508613
SUSAP KSEAK1EELN2  1ODESS 010ODESSK1EA2P                          0000                                  046518804
SUSAP KSEAK1EELN2  1ODESS 020HAMURK1EA1E       TF                                                       046528508
SUSAP KSEAK1EELN2  1ODESS 020HAMURK1EA2P                          0400                                  046538613
SUSAP KSEAK1EELN2  1ODESS 030ELN  K1D 1VE H    TF                                                       046548508
SUSAP KSEAK1EELN2  1ODESS 030ELN  K1D 2P                          0630                                  046558613
SUSAP KSEAK1EELN2  2RW34B 010ELN  K1D 1V  H    IF                                 18000                 046568508
SUSAP KSEAK1EELN2  2RW34B 010ELN  K1D 2P                          0000                                  046578804
SUSAP KSEAK1EELN2  2RW34B 020BISSLK1PC1E       TF                                                       046588508
SUSAP KSEAK1EELN2  2RW34B 020BISSLK1PC2P                          0450                                  046598613
SUSAP KSEAK1EELN2  2RW34B 030         1        VD SEA K1      26000300                   250            046608508
SUSAP KSEAK1EELN2  2RW34B 030         2P                          0060                                  046618613
SUSAP KSEAK1EELN2  2RW34B 040         1        VD SEA K1      26000250       10000                      046628508
SUSAP KSEAK1EELN2  2RW34B 040         2P                          0050                                  046638613
SUSAP KSEAK1EELN2  2RW34B 050KSEA K1PA1AE      VM             2600                                      046648508
```

INSTRUMENT APPROACH PROCEDURES (PF)
(With Flight Planning Continuations)

```
SUSAP KSEAK1FI16R  APAE  010PAE  K1D 1V        FC PAE K1   0000000016100131  + 02000     18000                        047128504
SUSAP KSEAK1FI16R  APAE  010PAE  K1D 2P                                0131                                           047138613
SUSAP KSEAK1FI16R  APAE  020ANVILK1PC1EE       CF ISZIK1   3383011016100040  + 02000                                  047148401
SUSAP KSEAK1FI16R  APAE  020ANVILK1PC2P                                0040                                           047158613
SUSAP KSEAK1FI16R  I     010ANVILK1PC1E  I     IF ISZIK1   33830110          I 020000190018000                        047168504
SUSAP KSEAK1FI16R  I     010ANVILK1PC2P                                0000                                           047178804
SUSAP KSEAK1FI16R  I     020PARKKK1PC1E  F     CF ISZIK1   3397005815800052  G 0190001803        000PARKK K1PC        047188904
SUSAP KSEAK1FI16R  I     020PARKKK1PC2P                                0052                                           047198613
SUSAP KSEAK1FI16R  I     030RW16RK1PG1G        CF ISZIK1   3383001715800041    01809                                  047208506
SUSAP KSEAK1FI16R  I     030RW16RK1PG2P                                0041                                           047218613
SUSAP KSEAK1FI16R  I     040DONDOK1PC1E M      CF SEA K1   1577004315720060    01800                                  047228506
SUSAP KSEAK1FI16R  I     040DONDOK1PC2P                                0060                                           047238613
SUSAP KSEAK1FI16R  I     050DONDOK1PC1EE HR    HM                  3380T010                                           047248506
SUSAP KSEAK1FI16R  I     050DONDOK1PC2P                                0000                                           047258506
SUSAP KSEAK1FV16L  APAE  010PAE  K1D 1V        FC PAE K1   0000000016200123  + 02100     18000                        047448709
SUSAP KSEAK1FV16L  APAE  010PAE  K1D 2P                                0123                                           047458613
SUSAP KSEAK1FV16L  APAE  020FF16LK1PC1EE       CF PAE K1   1603022315800100  + 02100                                  047468709
SUSAP KSEAK1FV16L  APAE  020FF16LK1PC2P                                0100                                           047478613
SUSAP KSEAK1FV16L  ASEA  010SEA  K1D 1V        IF                                        18000                        047488602
SUSAP KSEAK1FV16L  ASEA  010SEA  K1D 2P                                0000                                           047498804
SUSAP KSEAK1FV16L  ASEA  020FF16LK1PC1E        CF SEA K1   3380005833900058  + 02100                                  047508709
SUSAP KSEAK1FV16L  ASEA  020FF16LK1PC2P                                0058                                           047518613
SUSAP KSEAK1FV16L  ASEA  030FF16LK1PC1E   R    PI SEA K1   3380005829300100  + 02100                                  047528709
SUSAP KSEAK1FV16L  ASEA  030FF16LK1PC2P                                0100                                           047538613
SUSAP KSEAK1FV16L  ASEA  040FF16LK1PC1EE       CF SEA K1   3380005815800100  + 01800                                  047548304
SUSAP KSEAK1FV16L  ASEA  040FF16LK1PC2P                                0100                                           047558613
SUSAP KSEAK1FV16L  V     020FF16LK1PC1E  F     IF SEA K1   33800058            01800     18000     SEA   K1D          047568904
SUSAP KSEAK1FV16L  V     020FF16LK1PC2P                                0000                                           047578804
SUSAP KSEAK1FV16L  V     030RW16LK1PG1G        CF SEA K1   3407001615800041    00478           -310                   047588507
SUSAP KSEAK1FV16L  V     030RW16LK1PG2P                                0041                                           047598613
SUSAP KSEAK1FV16L  V     040DONDOK1PC1E M      CF SEA K1   1577004315850059  + 01800                                  047608711
SUSAP KSEAK1FV16L  V     040DONDOK1PC2P                                0059                                           047618613
SUSAP KSEAK1FV16L  V     050DONDOK1PC1EE HR    HM                  3380T010                                           047628507
SUSAP KSEAK1FV16L  V     050DONDOK1PC2P                                0000                                           047638804
```

RUNWAY (PG)
(With Simulation Continuations)

```
SUSAP KSEAK1GRW16L   1119001604 N47274546W122182351          00428049050150      0000       047888808
SUSAP KSEAK1GRW16L   2S                            18040N   L00428                          047908808
SUSAP KSEAK1GRW16R   1094251604 N47275035W122183511          00426000055150 ISZI 0000       047918808
SUSAP KSEAK1GRW16R   2S                            18030N   L00426                          047938808
SUSAP KSEAK1GRW34L   1094253404 N47261733W122183593          00359000050150      0000       047948808
SUSAP KSEAK1GRW34L   2S                            00030N   L00359                          047968808
SUSAP KSEAK1GRW34R   1119003404 N47255286W122182451          00343000064150 ISEA 0000       047978808
SUSAP KSEAK1GRW34R   2S                            00040N   L00343                          047998808
```

LOCALIZER/GLIDE SLOPE (PI)
(With Simulation Continuations)

```
SUSAP KSEAK1IISEA1   111030RW34RN47275488W1221823423380N47260403W1221818590464 11340331275E02206400352            048008808
SUSAP KSEAK1IISEA1   2S    U  Y                 36000N                            140                            048018505
SUSAP KSEAK1IISZI2   111170RW16RN47260944W1221836001580N47273932W1221841030799 11190395300E02205500421            048028313
SUSAP KSEAK1IISZI2   2S    U  N                 18000N                            140                            048038313
```

MLS (PL)

```
SUSAP KSEAK1MMSZI1   1516  RW34RN47275430W1221823303380N47260400W1221819000460 1130040040040040120E022005500275335   048048808
SUSAP KSEAK1MMSZI1   2     S  HEN47260940W1221836001580N47270510W1221838400460     02002002002O1700Y3500Y56          048058808
```

LOCALIZER MARKER (PM)

```
SUSAP KSEAK1MISEA MM 0     RW34RN47251830W1221824800004                                  E0220                  048068808
SUSAP KSEAK1MISEALOM 002240RW34RN47215090W1221827900004N47215090W122182790HOMW  U21 SE    E0220                  048078802
SUSAP KSEAK1MISZI IM 0     RW16RN47275920W1221834601803                                  E0220                  048088613
SUSAP KSEAK1MISZI MM 0     RW16RN47282060W1221835101803                                  E0220                  048098613
SUSAP KSEAK1MISZILOM 002810RW16RN47315720W1221820601803N47315720W122182060HOMW  U21 SZ    E0220                  048108802
```

MINIMUM SECTOR ALTITUDE (MSA) (PS)

```
SUSAP KSEAK1SDONDOK1PC              0 25180062270071360034                                                       048118612
SUSAP KSEAK1SPARKKK1PC              0 25180062360045                                                             048128704
SUSAP KSEAK1SSEA  K1D               0 25180062360034                                                             048138612
```

AIRPORT COMMUNICATIONS (PV)

```
SUSAP KSEAK1VAPP0011920 V0    RA N47265700W122182910E019900429Y070158B0400010000KSEAK1PA 00      SEATTLE              048148810
SUSAP KSEAK1VAPP0011950 V0L DRA N47265700W122182910E019900429Y261306             KSEAK1PA 00      SEATTLE              048158811
SUSAP KSEAK1VATI0012800 V0     A N47265700W122182910E019900429Y                           00                           048168810
SUSAP KSEAK1VCPT0012800 V0P    A N47265700W122182910E019900429Y                           00      SEATTLE              048178810
SUSAP KSEAK1VDEP0011920 V0    RA N47265700W122182910E019900429Y070158             KSEAK1PA 00      SEATTLE              048188811
SUSAP KSEAK1VDEP0011950 V0 S RA N47265700W122182910E019900429Y261306             KSEAK1PA 00      SEATTLE              048198810
SUSAP KSEAK1VGND0012170 V0     A N47265700W122182910E019900429Y                           00      SEATTLE              048228810
SUSAP KSEAK1VGTE0012625 V0     A N47265700W122182910E019900429Y                           00      GATE CONTROL         048238810
SUSAP KSEAK1VTCA0011920 V1    RA N47265700W122182910E019900429Y                           00      SEATTLE APPROACH     048248904
SUSAP KSEAK1VTCA0011920 V2 RW16 070-140, RW34 280-069                                                              048258904
SUSAP KSEAK1VTCA0011950 V1    RA N47265700W122182910E019900429Y141279             KSEAK1PA 00      SEATTLE APPROACH     048268811
SUSAP KSEAK1VTCA0011950 V2 RWY 34                                                                                  048278810
SUSAP KSEAK1VTWR0011990 V0     A N47265700W122182910E019900429Y                           00      SEATTLE              048328810
SUSAP KSEAK1VUNI0012295 V0     A N47265700W122182910E019900429Y                           00      SEATTLE-TACOMA INTL  048338811
```

AIRPORT (PA)
(With Flight Planning Continuations)

```
SUSAP KYKMK1AYKM     110000076Y N46340610W120323300E019301095250YKM K11800018000MU00Y NAS    YAKIMA AIR TERMINAL    054488807
SUSAP KYKMK1AYKM     2PKZSEKZSE                                                                                    054508807
```

TERMINAL WAYPOINT (PC)
(With Flight Planning Continuations)

```
SUSAP KYKMK1CCI27  K11    ICF   N46290320W120123080          E0191          T  IYKM089/D15.5          054518903
SUSAP KYKMK1CCI27  K12PKZSEKZSE                                                                        054738903
```

TERMINAL NDB NAVAID (PN)
(With Simulation and Flight Planning Continuations)

```
SUSAPNKSEAK1 SE    K1103350HOMW N47215090W122182790          E0220          NASSEATTLE             019888807
SUSAPNKSEAK1 SE    K12S     U21                                                                    019908807
SUSAPNKSEAK1 SE    K13PKZSEKZSE                                                                    019918807
SUSAPNKSEAK1 SZ    K1103140HOMW N47315720W122182060          E0220          NASSEATTLE             020088110
SUSAPNKSEAK1 SZ    K12S     U21                                                                    020108110
SUSAPNKSEAK1 SZ    K13PKZSEKZSE                                                                    020118110
```

FIR/UIR (UF)

```
SUSAUFKZSEZQZXF00100CZVR    13N G N48200000W128000000          17999          AA SEATTLE           059648809
SUSAUFKZSEZQZXF00200CZVR        H N48300000W125000000                                               059658804
SUSAUFKZSEZQZXF00300CZVR        G N48300000W124450000                                               059668809
SUSAUFKZSEZQZXF00400CZVR        G N48132015W123314105                                               059678809
SUSAUFKZSEZQZXF00500CZVR        G N48163607W123150796                                               059688809
SUSAUFKZSEZQZXF00600CZVR        G N48251928W123065473                                               059698809
SUSAUFKZSEZQZXF00700CZVR        G N48412300W123151982                                               059708809
SUSAUFKZSEZQZXF00800CZVR        G N48455181W122595674                                               059718809
SUSAUFKZSEZQZXF00900CZVR        G N48491916W122595780                                               059728809
SUSAUFKZSEZQZXF01000CZVR        H N49000000W123182562                                               059738804
SUSAUFKZSEZQZXF01050CZVR        H N49000000W121300000                                               059748804
SUSAUFKZSEZQZXF01100CZVR        H N49000000W121000000                                               059758804
SUSAUFKZSEZQZXF01200CZVR        H N49000000W120300000                                               059768804
SUSAUFKZSEZQZXF01300CZVR        H N49000000W120000000                                               059778804
SUSAUFKZSEZQZXF01400CZVR        H N49000000W119300000                                               059788804
SUSAUFKZSEZQZXF01500CZVR        H N49000000W119000000                                               059798804
SUSAUFKZSEZQZXF01600CZVR        H N49000000W118300000                                               059808804
SUSAUFKZSEZQZXF01700CZVR        H N49000000W118000000                                               059818804
SUSAUFKZSEZQZXF01800CZVR        H N49000000W117300000                                               059828804
```

FIR/UIR (UF)
(Continued)

```
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SUSAUFKZSEZQZXF02100CZVR     H N49000000W116300000     059858804
SUSAUFKZSEZQZXF02200CZVR     H N49000000W116000000     059868804
SUSAUFKZSEZQZXF02300CZEG     H N49000000W115300000     059878804
SUSAUFKZSEZQZXF02400CZEG     H N49000000W115000000     059888804
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SUSAUFKZSEZQZXF02700KZLC     H N45200000W115000000     059918804
SUSAUFKZSEZQZXF02800KZLC     G N45200000W117450000     059928809
SUSAUFKZSEZQZXF02900KZLC     G N44510000W118270000     059938809
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SUSAUFKZSEZQZXF03200KZLC     H N41000000W119300000     059968804
SUSAUFKZSEZQZXF03300KZOA     G N41000000W121150000     059978809
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```

FIR/UIR (UF)
(Continued)

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SUSAUFKZSEZQZXU00500	CZVR	G	N48163607W123150796			060128809
SUSAUFKZSEZQZXU00600	CZVR	G	N48251928W123065473			060138809
SUSAUFKZSEZQZXU00700	CZVR	G	N48412300W123151982			060148809
SUSAUFKZSEZQZXU00800	CZVR	G	N48455181W122595674			060158809
SUSAUFKZSEZQZXU00900	CZVR	G	N48491916W122595780			060168809
SUSAUFKZSEZQZXU01000	CZVR	H	N49000000W123182562			060178804
SUSAUFKZSEZQZXU01100	CZVR	H	N49000000W121300000			060188804
SUSAUFKZSEZQZXU01200	CZVR	H	N49000000W121000000			060198804
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SUSAUFKZSEZQZXU02100	CZVR	H	N49000000W116300000			060288804
SUSAUFKZSEZQZXU02200	CZVR	H	N49000000W116000000			060298804
SUSAUFKZSEZQZXU02300	CZEG	H	N49000000W115300000			060308804
SUSAUFKZSEZQZXU02400	CZEG	H	N49000000W115000000			060318804
SUSAUFKZSEZQZXU02500	CZEG	G	N49000000W114400000			060328809
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SUSAUFKZSEZQZXU02700	KZLC	H	N45200000W115000000			060348804
SUSAUFKZSEZQZXU02800	KZLC	G	N45200000W117450000			060358809
SUSAUFKZSEZQZXU02900	KZLC	G	N44510000W118270000			060368812
SUSAUFKZSEZQZXU03000	KZLC	G	N43380000W119170000			060378809
SUSAUFKZSEZQZXU03100	KZLC	G	N42400000W119000000			060388809
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SUSAUFKZSEZQZXU03900	KZOA	G	N40130000W125200000			060468809
SUSAUFKZSEZQZXU04000	KZOA	G	N40590000W126540000			060478809
SUSAUFKZSEZQZXU04100	KZOA	G	N43180800W126404600			060488812
SUSAUFKZSEZQZXU04200	KZOA	G	N45000000W126300000			060498809
SUSAUFKZSEZQZXU04300	KZOA	GE	N45302800W126425900			060508812

RESTRICTIVE AIRSPACE (UR)

```
SUSAURK1A680         A00101LN    CE                  N48110000W1223800000030      GND   03000MA-680                          060518807
SUSAURK1A680         A00102T T15120024001500010200                                                                            060528808
SUSAURK1A680         B00101LN    CE                  N48110000W1223800000030      03000M10000MA-680                          060538807
SUSAURK1A680         B00102T T15120024001500010130                                                                            060548808
SUSAURK1MCHINOOK A    00101LN    G N48060300W122371500                            00300M05000MCHINOOK A                       060558807
SUSAURK1MCHINOOK A    00102H T1707001700                                                                FAA SEATTLE ARTCC     060568811
SUSAURK1MCHINOOK A    00200      G N48055500W122341600                                                                        060578806
SUSAURK1MCHINOOK A    00300      G N47520700W122363100                                                                        060588806
SUSAURK1MCHINOOK A    00400      GEN47522100W122393000                                                                        060598806
SUSAURK1R5704         00101LN    G N45520000W119290000                            GND   03999MR-5704                          062498807
SUSAURK1R5704         00102T S1509001700                                                                                      062468807
SUSAURK1R5704         00200      H N45500000W119290000                                                                        062478807
SUSAURK1R5704         00300      G N45500000W119303000                                                                        062488807
SUSAURK1R5704         00400      HEN45520000W119303000                                                                        062498807
SUSAURK1W460A         00101B N   G N46430000W128490000                            GND   UNLTD W-460A                          064108807
SUSAURK1W460A         00102                                                                             FAA OAKLAND ARTCC     064118807
SUSAURK1W460A         00200      G N47013000W127230000                                                                        064128807
SUSAURK1W460A         00300      G N46080000W127000000                                                                        064138807
SUSAURK1W460A         00400      GEN45500000W128270000                                                                        064148807
```

GATES (PB)

```
TXYZP KSEAK1BABCDE    0          N47263000W122180600                                      CENTER CONCOURSE B737-300064158813
TXYZP KSEAK1BNORTH    0          N47274200W122180600                                      NORTH APRON NOSE IN-STAND064168813
```

ATTACHMENT 4
AIRWAY MINIMUM ALTITUDES

A. An ARINC 424 Data Base may contain three "levels" of Enroute Airways. These are "High," "Low" and "Both" Level routes. The following descriptions apply:

1. High Altitude Airways, Airway Level code of "H," shall contain:

    a. Routes that exist only in the upper airspace as officially designated by the appropriate authority.

    b. Routes that are officially designated as "Upper" or "High" even though the structure in which they exist has not been officially established as "Upper Airspace."

    c. Routes that, by virtue of the assigned MEA or MFA, must be charted as high level routes.

2. Both Altitude Airways. Airway Level code of "B," shall contain:

    a. Routes that are not specifically defined into either the upper or lower airspace in a structure that does recognize these airspace divisions, for example the "Control Routes" in the USA and CAN coverages.

    b. Routes that exist without a "level designator" that are in a structure that does recognize the division of Upper and Lower Airspace.

    c. Routes that exist in a structure that has Upper and Lower Airspace when such routes have a MEA or MFA assigned lower than the upper limit of Lower Airspace and a MAA above the upper limit of Lower Airspace.

c-10 3. Low Altitude Airways. Airway Level code of "L," shall contain:

    a. Routes that exist only the lower airspace as officially established by the appropriate authority.

    b. Routes that, by virtue of the published MAA, must be charted in lower airspace only.

4. Enroute Airway Sequencing.

    Airways changing from one level to another level will be sequenced in order as any airway in the same level. The Airway Level Code is not used to sort airways in an ARINC 424 data base.

    When an airway changes from Airway Level Code "B" to two separate airways that are coded as "L" and "H," the point of change will carry the "B" in the level field.

B. High Altitude Airways.

The altitude information shown on "High Level" records will be established with the following criteria:

1. The altitude information included for High Altitude Airways will be derived from official government source. The values entered for "Minimum Altitude" will be published MEAs (Minimum Enroute Altitude) or MFAs (Minimum Flight Altitude). If neither of those two values are available through source documentation, the lower limit of the designated upper airspace will be entered.

2. There are two Minimum Altitude fields. The second of these is only used when an Enroute Airway has been published with "Directional MEAs" or "Directional MFAs." "Directional" information is considered to exist when the difference in altitude in opposing flight directions is higher than would be indicated by normal separation standards.

3. For Enroute Airways published with non-standard separation or blocked altitudes, the first Minimum Altitude field will contain the lowest altitude available. The non-standard separation and/or blocked altitude information will be available in the "Cruise Table" referenced in the Enroute Airway Record.

4. The Maximum Altitude field will contain the highest useable altitude for the Enroute Airway Segment. This will be equal to the Upper Limit of the Designated Upper Airspace unless a lower altitude, a "MAA" or Maximum Authorized Altitude, has been published in the official government source.

ATTACHMENT 4 (cont'd)
AIRWAY MINIMUM ALTITUDES

C. Low Level and "Both" Level Airways.

The altitude information shown on "Both Level" and "Low Level" records will be established with the following criteria:

1. The altitude information included for "Both" Altitude and "Low" Altitude Airways will be derived from official government source. The values entered for "Minimum Altitude" will be published MEAs (Minimum Enroute Altitude) or MFAs (Minimum Flight Altitude) when such are available. If neither of those two values are available through source documentation, a code indicating one of the following two conditions will be used:

NESTB - MEA/MFA not established in source documentation. Used when the source does not establish minimum altitudes as a general rule. Also used when source documentation does provide minimum altitude information as a general rule and has explicitly not established a value for a specific route segment or segments. c-10

UNKNN - MEA/MFA Minimum Altitude was unknown at the time the data base was produced but the source documentation does provide MEA or MFA as a general rule. The data base supplier expects that future source documentation will provide some minimum altitude information.

2. There are two Minimum Altitude fields. The second of these is only used when an Enroute Airway has been published with "Directional MEAs" or "Directional MFAs." "Directional" information is considered to exist when the difference in altitude in opposing flight directions is higher than would be indicated by normal separation standards. "Directional" altitudes will not be provided for "NESTB" and "UNKNN."

3. For Enroute Airways published with non-standard separation or blocked altitudes, the first Minimum Altitude field will contain the lowest altitude available. The non-standard separation and/or blocked altitude information will be available in the "Cruise Table" referenced in the Enroute Airway Record.

4. The Maximum Altitude field will contain the highest useable altitude for the Enroute Airway Segment. This will be equal to the highest available Flight Level in the Designated Airspace in which the route is available (Low Altitude Structure or "Both" Altitude Structure) unless a lower altitude, a "MAA" or Maximum Authorized Altitude, has been published in the official government source.

ATTACHMENT 5
PATH AND TERMINATOR

c-14 Throughout this Attachment many rules and standards for the preparation of coding for Terminal Procedures (SIDs/STARs/Approaches) from official government source documentation into the ARINC Navigation Database format have been documented. These rules and standards use the words “must” and “will” as defined below:

“MUST” = Obligation, no other choice.
“WILL” = Desired, decision by data authority implied.

c-10 The Path and Terminator concept is a means to permit coding of Terminal Area Procedures, SIDs, STARs and Approach Procedures, without proliferating the number of named waypoints required to support such procedures. Although it is the intent of this attachment to provide consistent rules, where a contradiction exists between a general rule and a specific rule, the specific rule must be used. The Path and Terminator concept includes a set of defined codes referred to as Path Terminators. Each Code defines a specific type of flight path and a specific type of termination of that flight path. Path Terminators are assigned to all SIDs, STARs and Approach Procedure segments in accordance with the rules set forth in this Attachment. This Attachment also includes rules regarding leg data fields associated with each Path Terminator.

c-6 It is desirable that all navigation systems be designed to accept all leg types defined in this Attachment. However, as this Attachment has been dynamic, with new leg types being added, it may be required or desirable not to implement all leg types c-11 in any given navigation airborne system. An example of this is the heading (VX) legs versus the course (CX) legs, which were added later. A given system may not have the CX legs (with the exception of the CF leg) implemented. Coding by database suppliers must be accomplished using Path Terminators most appropriately reflecting the official government source documentation.

c-14 Unless otherwise specifically stated, all of the rules, information and guidelines in this Attachment apply equally to fixed-wing and rotor-wing terminal procedures.

c-11 The RF Leg type, added with Supplement 11, was introduced with the guidelines listed below.

The RF Leg is to be used only in the following cases:

1. When coding procedure types which were designed with the RF Constant Radius Turn capability as a design criteria.

2. When coding procedure types which were not designed with the RF Leg capability as a criteria as long as both the original coding and the RF Leg specific coding are available and uniquely identified.

3. When coding procedure types which were not designed with the RF Leg capability as a criteria but which cannot be coded using other path terminators.

c-14 In order to achieve these coding rule goals, and to ultimately simplify the path terminator matrix currently required to define present-day terminal area procedures, it is in the interest of all user airlines to prevail upon their government agencies and ATC authorities to:

c-10

A. Permit FMS-equipped airplanes to fly tracks instead of procedural headings and,

B. Design Terminal area procedures to be compatible with the capabilities of the increasing number of FMS-Equipped airplanes entering service.

c-14 The Path and Terminator concept is to accommodate the performance capabilities of various fixed-wing aircraft types. Airmass Path and Terminator constraints are generally for fixed-wing aircraft only. In order to accomplish this requirement, certain values are established for coding the Path and Termination for fixed-wing aircraft. These values have been established to allow data base suppliers to code turn and distance fields to a single set of rules. If official government source specifies values other than these established values, source data will be used.

c-10

1. Speed

   A speed of 210 knots, ground speed, will be used to compute distance based on time (3.5 NM per minute). On “Course Reversal” Path Terminators, if no time or distance is specified, a minimum distance of 4.3 NM will be used prior to turning inbound.

2. Bank Angle

   A maximum bank angle of 25 degrees will be used to compute turn radius. A full 180 degree turn would require a minimum of 4 nautical miles in diameter.

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

3. Climb Rate

A climb rate of 500 feet per nautical mile will be used for computations. For missed approach, the climb rate must begin at the Missed Approach Point. For departure procedures, the climb rate must begin at the take-off end of the runway unless otherwise specified by source.

4. Tear Drop Procedures

If no distance limit is given, or if a time is given, use the following table to determine the length of the outbound leg.

Angle of Divergence	Nautical Miles	Outbound Time
18	10.5	2:45
20	9.5	2:30
22	8.6	2:15
24	7.9	2:00
26	7.3	1:55
28	6.8	1:45
30	6.3	1:40
32	5.9	1:30
34	5.6	1:28
36	5.3	1:23
38	5.0	1:18
40	4.7	1:14
42	4.5	1:10
44	4.3	1:07

This table is based on a speed of 210 knots and a Density Altitude of 5000 Feet. Any procedure that does not fall within this table would not be coded.

5. Intercept Angles

When the government source does not specify the intercept angle, the following angles must be used:

A. Use 30 degrees on approach transitions to intercept the localizer approach path.

B. Use 30 to 45 degrees on all other procedures.

C. Use a VI Path Terminator and 30 to 45 degrees intercept if there is a fix termination in the current leg followed by a 3NM or greater gap between start of turn and the track in the leg to be intercepted. c-10

1.0 GENERAL RULES

1.1 NAVAID related Leg Types

Specific leg types require a reference Navaid. The details of which leg types and which Navaid types are to be used can be seen in Section 5.23 of the main document and Table 3 of this Attachment.

1.2 Beginning and Ending Leg Types

The Beginning and Ending Leg of a SID, STAR or Approach Route will be selected from the following table. Note that Profile Descents and their transitions are coded in the same manner as STARs and STAR Transitions.

Note: In general, the same Beginning and Ending Leg types will be used for Helicopter SIDs, STARs and Approaches as listed for fixed-wing aircraft. No additional types are authorized and use of the authorized types should be consistent with helicopter flight capabilities. c-14

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

1.2 Beginning and Ending Leg Types (cont'd)

Procedure	Beginning Leg	Ending Leg
SID Runway Transition Route Type 0, 1, 4, F and T	CA, CD, CF, CI, CR, DF, FA, FC, FD FM[1], VA, VD, VI, VM[1], VR	AF, CF, DF, FM[2], HA, HM[2], TF, VM[2]
SID Route Type 2, 5, or M	CA[3], CD[3], CF[3], CI[3], CR[3], DF[3], FA, FC, FD, FM[1], IF[4], VA[3], VD[3], VI[3], VM[1 AND 3], VR[3]	AF, CF, DF, HA, IF[4], TF
SID Enroute Transition Route Type 3, 6, S or V	FA, FC, FD, IF	AF, CF, DF, HA, TF
STAR Enroute Transition Route Type 1, 4, 7 or F	FC, FD, IF	AF, CF, DF, HA, TF
STAR Route Type 2, 5, 8 or M	FC, FD, IF	AF, CF, DF, FM, IF[4], TF, VM
c-13 STAR Runway Transition Route Type 3, 6, 9 or S	FC, FD, HF, IF	AF, CF, FM, HF, HM, TF, VM
Approach Transition Route Type A	FC, FD, HF, IF, PI	AF, CF, CI[5], HF, HM, PI, TF, VI[5], RF[7]
Approach Route Types in Section 5.7	IF	CF, TF[8]
Missed Approach Route Type Z	AF[9], CA, CD, CF, CI, CR, DF[10], FA, FC, FD, FM, HA, HM, RF[9], VA, VD, VI, VM, VR	AF, CA, CF, DF, FM, HM, TF, VA, VM

Explanation of Notes in Table

1 When followed by a CF or DF leg or when Route Type is "T", Vector SID.

2 When Route Type is "0", Engine Out SID.

3 When SID Procedure has NO Runway Transitions

4 When "IF" leg is the one and only record in the SID/STAR route.

5 When Approach Transition is localizer based.

7 When Approach Transition is for GPS Approach Procedure.

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8 When Final Approach is GPS or some types of MLS Approach or other specific cases where it has been determined that a "TF" is more satisfactory than a "CF".

c-13 9 When "AF" or "RF" are published to begin at the published Missed Approach Point.

c-14 10 When used on GPS, RNAV or RNAV - GPS/GLS Approach Coding.

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PATH AND TERMINATOR

1.3 Leg Sequencing

The following table defines the permitted leg sequences within the individual procedures. A shaded space indicates that the "current leg/next leg" sequence is not permitted within individual procedure routes.

	AF	CA	CD	CF	CI	CR	DF	FA	FC	FD	FM	HA	HF	HM	IF	PI	RF	TF	VA	VD	VI	VM	VR
AF																							
CA																							
CD																							
CF							&																
CI																							
CR																							
DF							&																
FA																							
FC							&																
FD																							
FM																							
HA																							
HF																							
HM																							
IF								*	*	*	*	*	*	*		*	#						
PI																							
RF																							
TF																							
VA																							
VD																							
VI																							
VM																							
VR																							

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* = The IF leg is coded only when the altitude constraints at each end of the "FX," "HX" or "PI" leg are different.

& = A CF/DF, DF/DF or FC/DF sequence should only be used when the termination of the first leg must be overflown, otherwise alternative coding should be used. See also Rule 3.1 in this Attachment.

= The IF/RF combination is only permitted at the start of the final approach for FMS, GPS or MLS coding and only when a straight line, fixed terminated transition proceeds the start of the final. See Rule 6.11.2 in this Attachment.

1.4 Leg Type Descriptions

The following illustration on the various Leg Types are provided to assist coding and decoding of the Path and Terminator concept.

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

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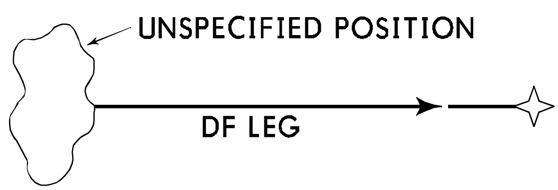
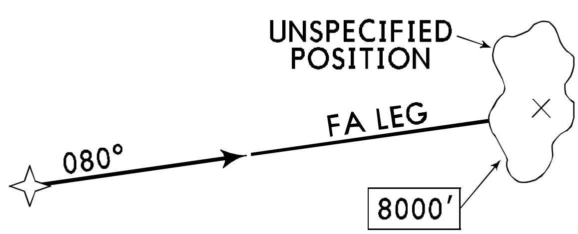
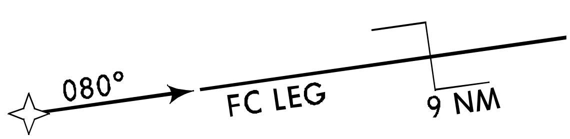
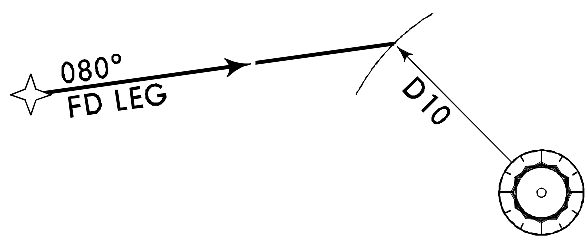
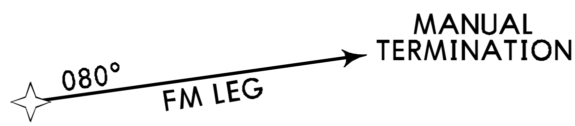
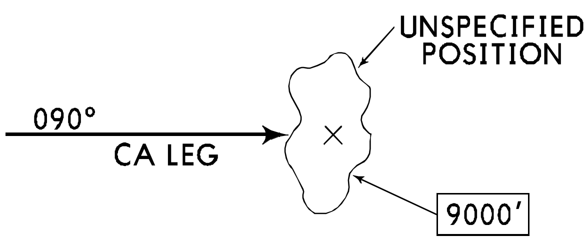
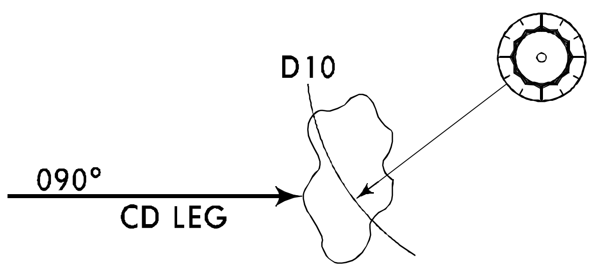
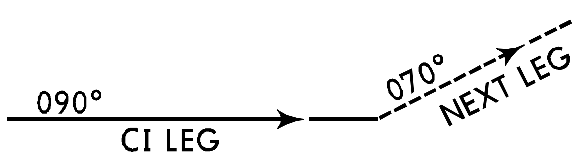
Leg Code	Example Path	Description
IF		Figure 1: Initial Fix or IF Leg. Defines a database fix as a point in space.
TF		Figure 2: Track to a Fix or TF Leg. Defines a great circle track over ground between two known databases fixes.
CF		Figure 3: Course to a Fix or CF Leg. Defines a specified course to a specific database fix.
DF		Figure 4: Direct to a Fix or DF Leg. Defines an unspecified track starting from an undefined position to a specific database fix. Note: See also Table 1.3, Leg Sequencing, for other uses of the DF Leg.
FA		Figure 5: Fix to an Altitude or FA Leg. Defines a specified track over ground from a database fix to a specified altitude at an unspecified position.
FC		Figure 6: Track from a Fix from a Distance or FC Leg. Defines a specified track over ground from a database fix for a specific distance.

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

<table>
<tr><td>FD</td><td>
</td><td>Figure 7: Track from a Fix to a DME Distance or FD Leg. Defines a specified track over ground from a database fix to a specific DME Distance which is from a specific database DME Navaid.</td></tr>
<tr><td>FM</td><td>
</td><td>Figure 8: From a Fix to a Manual termination or FM Leg. Defines a specified track over ground from a database fix until Manual termination of the leg.</td></tr>
<tr><td>CA</td><td>
</td><td>Figure 9: Course to an Altitude or CA Leg. Defines a specified course to a specific altitude at an unspecified position.</td></tr>
<tr><td>CD</td><td>
</td><td>Figure 10: Course to a DME Distance or CD Leg. Defines a specified course to a specific DME Distance which is from a specific database DME Navaid.</td></tr>
<tr><td>CI</td><td>
</td><td>Figure 11: Course to an Intercept or CI Leg. Defines a specified course to intercept a subsequent leg.</td></tr>
</table>

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ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

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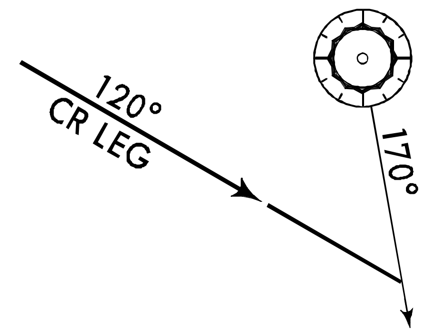
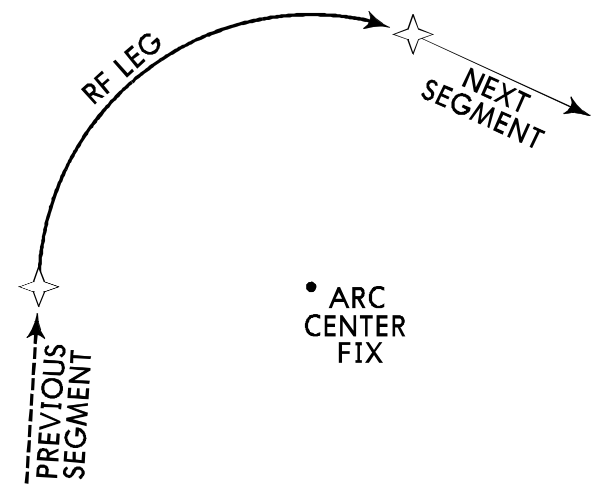
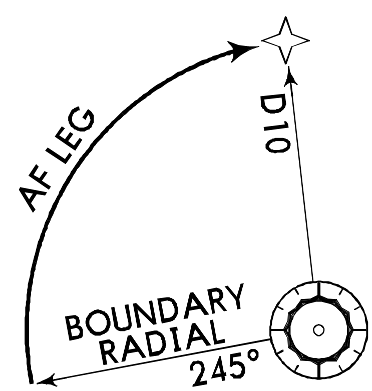
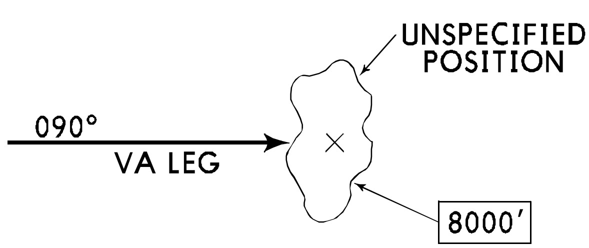
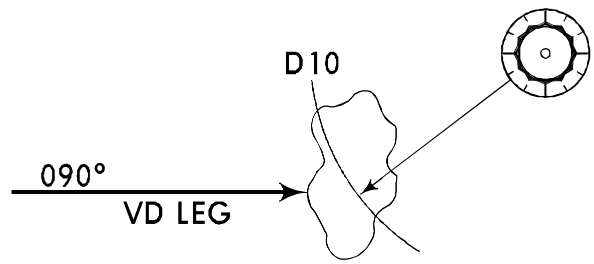
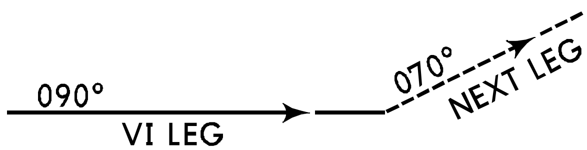
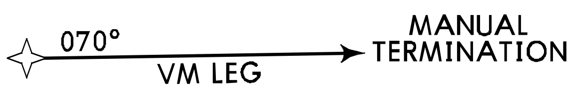
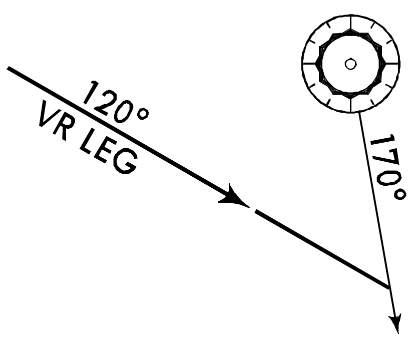
CR		Figure 12: Course to a Radial termination or CR Leg. Defines a course to a specified Radial from a specific database VOR Navaid.
RF		Figure 13: Constant Radius Arc or RF Leg. Defines a constant radius turn between two database fixes, lines tangent to the arc and a center fix. Note: While the arc initial point, arc ending point and arc centerpoint are all available as database fixes, implementation of this leg type may not require them to be available as fixes.
AF		Figure 14: Arc to a Fix or AF Leg. Defines a track over ground at specified constant distance from a database DME Navaid.
VA		Figure 15: Heading to an Altitude termination or VA Leg. Defines a specified heading to a specific Altitude termination at an unspecified position.

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

VD		Figure 16: Heading to a DME Distance termination or VD Leg. Defines a specified heading terminating at a specified DME Distance from a specific database DME Navaid.
VI		Figure 17: Heading to an Intercept or VI Leg. Defines a specified heading to intercept the subsequent leg at an unspecified position.
VM		Figure 18: Heading to a Manual termination or VM Leg. Defines a specified heading until a Manual termination.
VR		Figure 19: Heading to a Radial termination or VR Leg. Defines a specified heading to a specified radial from a specific database VOR Navaid.

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PATH AND TERMINATOR

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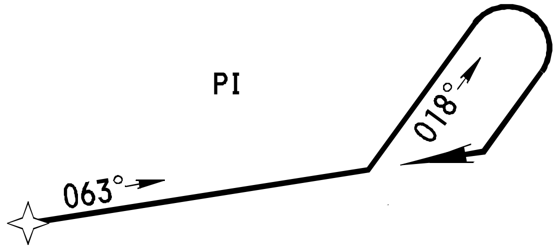
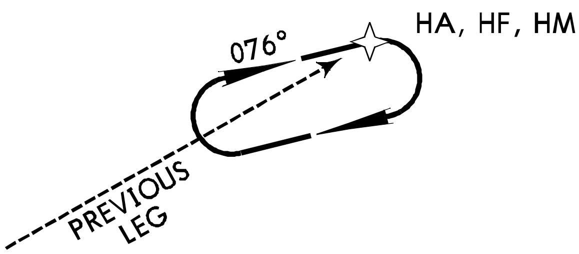
PI		Figure 20: 045/180 Procedure Turn or PI Leg. Defines a course reversal starting at a specific database fix, includes Outbound Leg followed by a left or right turn and 180 degree course reversal to intercept the next leg. A Maximum excursion Time or Distance is included as a data field.
HA, HF, HM		Figure 21: Racetrack Course Reversal or HA, HF and HM Leg Types. Define racetrack pattern course reversals at a specified database fix. Leg Time or Distance is included as a data field. The three codes indicate different path termination types: HA = Altitude Termination HF = Single circuit terminating at the fix. HM = Manual Termination.

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

1.5 Leg Data Fields

The following table proves detail on "Required" and "Optional" parameters used to define each leg type. An "O" in the table indicates that the parameter is considered optional and may be omitted as required in individual cases. All other entries indicate some type of a "required" situation for leg definition.

PT	W/P ID	OVR FLY	MAP	HLD	TD	TDV	RMD VHF	THE	RHO	OBD MAG CRS	TM/ DST	ALT ONE	ALT TWO	SPD LMT	VRT ANG	ARC CTR	COMMENTS
AF	X	O			X		X	X	X	R		O	O	O			OB MAG CRS=BNDY RDL, THETA=FIX RDL
CA			O		O	O				C		+		O			ALT TERM WILL BE "AT OR ABOVE"
CD			O		O	O	X			C	D	O	O	O			
CF	X	B	O		O	O	X	X	X	C	P	O	O	O	O		OB MAG CRS IS CRS TO SPECIFIED FIX
CI		O	O		O	O	O			C		O	O	O			
CR		O	O		O	O	X	X		C		O	O	O			
DF	X	B			O		O	O	O			O	O	O			
FA	X		O		O	O	X	X	X	C		+		O			ALT TERM WILL BE "AT OR ABOVE"
FC	X	B	O		O	O	X	X	X	C	P	O	O	O			
FD	X	O	O		O	O	X	X	X	C	D	O	O	O			
FM	X		O		O	O	X	X	X	C		O		O			
HA	X			X	O		O	O	O	C	X	+		O			ALT TERM WILL BE "AT OR ABOVE"
HF	X			X	O		O	O	O	C	X	O		O			
HM	X			X	O		O	O	O	C	X	O		O			
IF	X						O	O	O			O	O	O			
PI	X				X		X	X	X	C	P	X		O			DIST IS EXCURSION DIST FROM FIX
RF	X	O			X		O	O		T	A	O	O	O	O	X	THETA IS INBD TANGENTIAL TRACK
TF	X	O			O	O	O	O	O	O	O	O	O	O	O		
VA			O		O	O				H		+		O			ALT TERM WILL BE "AT OR ABOVE"
VD			O		O	O	X			H	O	O	O	O			
VI		O	O		O	O	O			H		O	O	O			
VM	O		O		O	O				H		O		O			FOR W/P ID SEE STAR CODING RULES
VR		O	O		O	O	X	X		H		O	O	O			

LEGEND:

X = REQUIRED FIELD
A = ALONG TRACK DISTANCE
O = OPTIONAL FIELD
P = PATH LENGTH
R = BOUNDARY RADIAL
C = COURSE
H = HEADING
T = OUTBOUND TANGENTIAL TRACK
D = DME DISTANCE
+ = "AT OR ABOVE" ONLY
SHADED = NOT APPLICABLE FIELD
B = "REQUIRED" FOR CF/DF, DF/DF OR FC/DF COMBINATIONS, OTHERWISE "OPTIONAL"

Leg Data Fields Table 3

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

2.0 CODING RULES APPLICABLE TO ALL PROCEDURES

c-14 2.1 All Procedures must be coded to provide guidance specified by source documentation.

2.2 Vertical angles are referenced to the terminating fix.

2.3 Use of a "C" in the Altitude Description field (5.29) may only be used in SID records and there only with the following leg types:

CD, CF, CR, FC, FD, TF, VD, VR

The conditional termination altitude can be coded in columns 90 through 95 of the SID record. If a "+," "-" or "blank" is coded in the Altitude Description field, input of a second altitude must imply a condition altitude termination.

c-14 2.4 Altitude terminations must not be used in descent procedures.

2.5 Lost Communication Procedures may be coded in place of "Vector Legs" if the procedure defines a complete route of flight to the end of a SID or STAR.

2.6 The "Turn Direction" and "Turn Direction Valid" leg data fields are used in combination to force a particular turn direction whenever the track/heading change exceeds 135 degrees. If the turn direction is indicated with the "L" or "R," then the turn direction valid character must be set to "Y." If the turn direction is indicated with "E," c-14 then the turn direction valid field must always be blank.

The Turn Direction/Turn Direction Valid combination is used to indicate that turn in the specified direction must be executed prior to intercepting the path defined in the record. Turn Direction must always be indicated whenever the turn is 90 degrees or more.

c-14 2.7 The first leg of each procedure will contain the appropriate transition "altitude." If the transition altitude is 18,000 feet, it may be omitted. See Section 5.53 for specifics on the appropriate altitude for each type of Terminal Procedure.

c-14 2.8 Non essential and transition essential waypoint codes are not used in the waypoint description field on terminal procedures. All waypoints must be considered as essential in these procedures.

3.0 PATH AND TERMINATION RELATED RULES VALID FOR ALL PROCEDURE TYPES

c-14 3.1 DF legs must be used to start from an unknown position such as an altitude or from DME or Distance terminations. A DF leg may follow a CF leg only when the CF leg fix must be overflown, otherwise a TF leg should be used. A DF may also be followed by another DF leg. In these cases, the fix at the end of the first DF leg must be overflown. When DF legs follow DME or Distance Terminations, that termination must be overflown. For distance terminations, the overfly parameter must be set, otherwise the combination is not permitted.

c-14 3.2 The distance leg data field must be completed on all CF legs. When the CF is preceded by an intercept, the no wind intercept distance will be provided. If the CF leg is the first leg of a missed approach, the distance entered will be from the approach runway fix or missed approach fix, whichever applies.

3.3 When a leg terminating at a fix ("XF" leg) is followed by a PI leg, the PI fix must be the same fix as the terminating fix on the preceding leg.

3.4 Rules specific to "arc" legs, leg type AF:

c-14 3.4.1 When an AF-AF leg sequence is coded, both legs must use the same "Recommended VHF Navaid" facility and the DME distance must be the same for both legs.

3.4.2 When any holding leg ("HX") or fix termination ("XF") is followed by an AF leg, the preceding termination fix must lie on the arc defined in the AF leg.

3.4.3 When a FD leg is followed by an AF leg type, the fix in the FD leg must have the same "Recommend VHF Navaid" as that defining the AF leg.

3.4.4 When a CD or VD leg type is followed by an AF leg type, both legs must have the same Recommended VHF Navaid. The DME distance must be the same for both legs.

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

3.4.5 When a CI leg type is followed by an AF leg type, the "course to" must be to the "Recommended VHF Navaid" which defines the AF arc.

3.5 When an AF, CF, DF, TF or "HX" leg is followed by any course-from leg type ("FX" legs), the "FX" leg must be from the same point as the preceding termination.

3.6 Leg types of CD, CR, FD, VD and VR "overfly" the terminator point. If "turn anticipation" is required to reflect the source, alternate leg types must be used. c-13

3.7 When the leg data type "Recommended Navaid" is coded in a CI or VI leg, it must be the same as the Recommended Navaid in the leg to be intercepted.

3.8 The TF leg type will be coded in preference to the CF leg type in all cases where the resulting path will be the same, except when coding some types of final approach procedure legs, see rules in Section 6.0, 7.0 and 8.0 of this Attachment. c-14

3.9 The FC leg type must be used when the distance in the "Time/Distance" field is the path length and is measured from the fix entered in the Waypoint Identifier field. c-14

The FD leg type must be used when the distance in the "Time/Distance" field is the "DME" distance from the Navaid entered in the Recommended Navaid field. c-14

3.10 FC or FD legs will not be used if the distance is greater than 60NM and are followed by a CF leg.

3.11 A PI leg is used to make a 180 degree course reversal when a holding or a tear drop turn is not specified. The course must be coded as 45 degrees from the reciprocal of the inbound course, unless otherwise specified by government sources. The turn direction is the direction made during the 180 reversal within the PI leg. A one minute outbound leg is implied from the fix to the initial 45 degree turn. c-14

3.12 The IF leg type will normally be used in an initial sequence of a procedure. The IF leg type, followed by a TF leg type will be used in other than the first sequence if such is required to correctly code the procedure as published by the source documentation when one or more of the following criteria are met - c-14

- there is no VHF Navaid available for use as the Recommended Navaid that would permit coding with other leg types.
- the leg to be intercepted will have a distance of more than 60 NM between the point of intercept and the terminating fix.

This will allow a segment to be constructed, from one fix to the next fix, using an "intercept" where coding would otherwise not be possible. See the sample use of this rule below.

3.13 When coding "arc paths," when the source defined ARC Center is a VHF Navaid of the types VORDME or VORTAC and the path is defined as a "DME ARC," the AF leg must be used instead of the RF leg. c-14

3.14 The previous leg and next leg associated with an RF leg should have a course or track which is tangent to the RF leg.

3.15 Use of a single RF leg is limited to turns of equal to or greater than 2 degrees and equal to or less than 300 degrees.

3.16 Phantom Waypoints. These database waypoints are established during procedure coding. Used to facilitate more accurate navigation under certain circumstances. c-13

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

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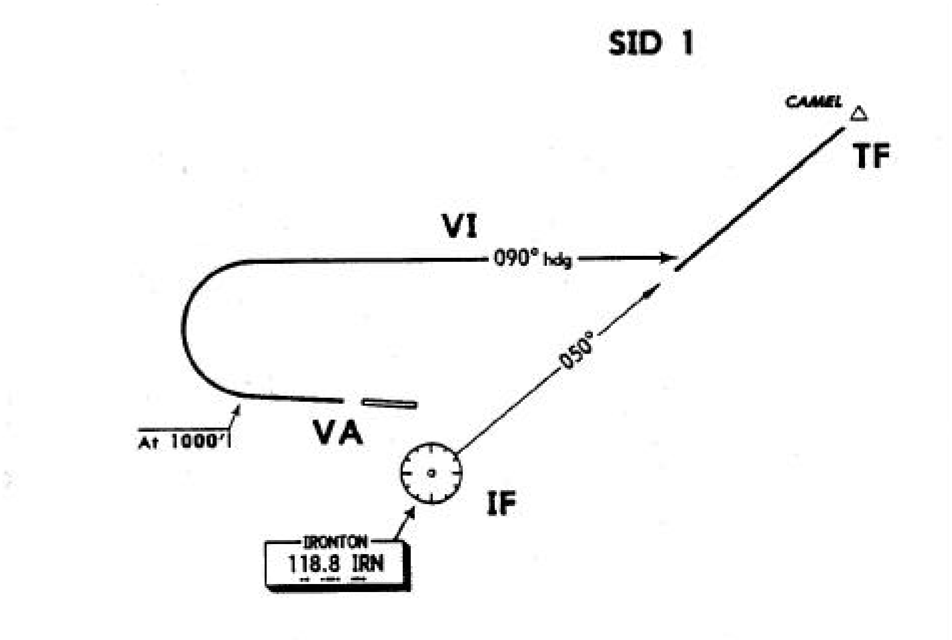

Normal SID Coding if IRN were a VORDME

SID IDENT	ROUTE TYPE	TRANS IDENT	WAYPOINT IDENT	DESC CODE	PATH TERM
SID 1	2	RW29			VA
SID 1	2	RW29			VI
SID 1	2	RW29	CAMEL	EE	CT

SID Coding required when IRN is VOR only

SID IDENT	ROUTE TYPE	TRANS IDENT	WAYPOINT IDENT	DESC CODE	PATH TERM
SID 1	2	RW29			VA
SID 1	2	RW29			VI
SID 1	2	RW29	IRN	V	IF
SID 1	2	RW29	CAMEL	EE	TF

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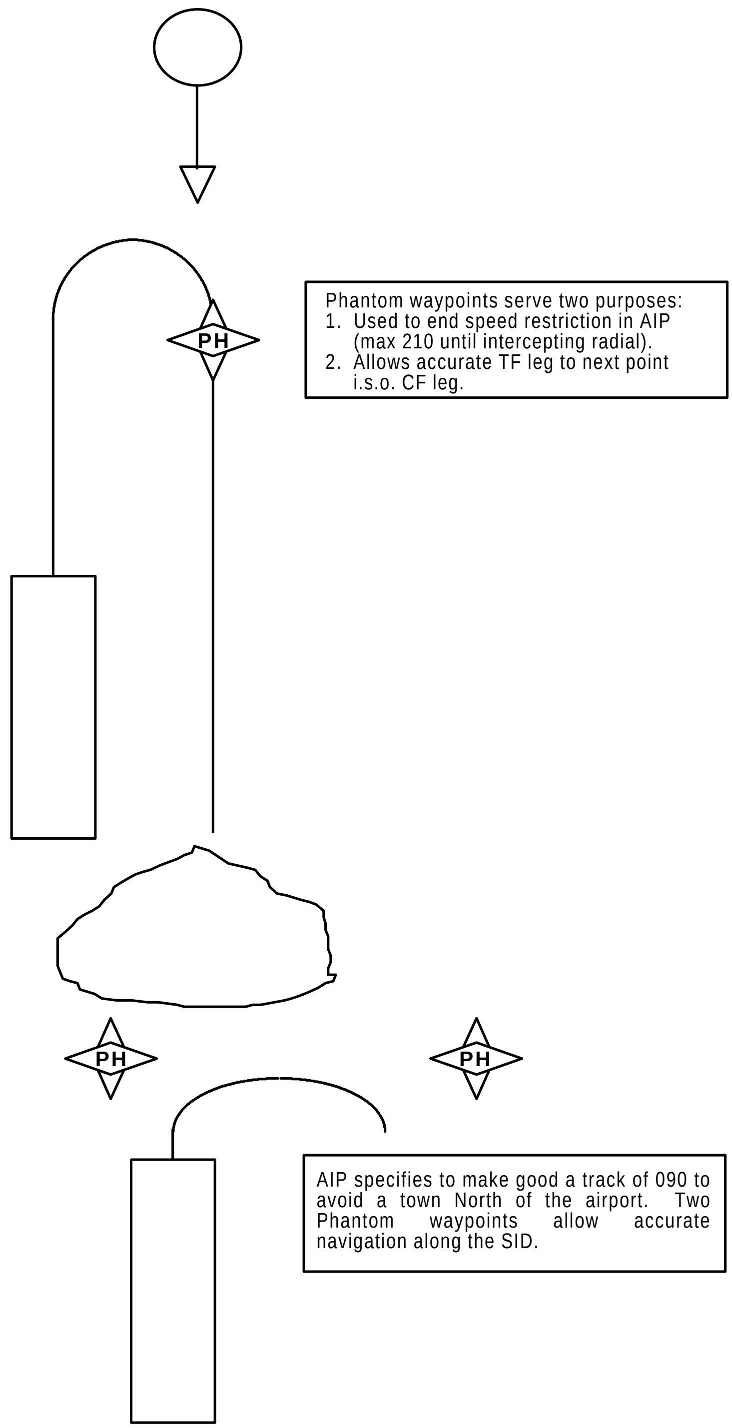
PATH AND TERMINATOR



ATTACHMENT 5 (cont’d)
PATH AND TERMINATOR

4.0 STANDARD INSTRUMENT DEPARTURE (SID) CODING RULES

4.1 If a published take-off requires a turn of greater than 15 degrees from the runway heading without an altitude specified before the turn or a cross track deviation between runway heading and departure track, at the departure end of the runway, of greater than 100 feet on a straight ahead departure would result, a CA, VA or FA on the runway heading to an altitude of 400 feet above the airport elevation (or as specified by source) must be coded before the turn or as the first leg of the departure.

c-12

4.2 For the first leg of a SID, course legs (“CX” or “FX”) are preferred over heading legs unless the source requires that heading legs be coded.

4.3 The use of FM or VM leg types in the first leg of a SID Runway Transition for Route Types of 0, 1 and 4 or F is permitted only where an initial heading is defined in the source and vectors will be provided to a fix or to a course to a fix. FM and VM leg types in the first leg of a SID Runway Transition for Route Type V (Vector SID) are permitted with or without the vector to a fix or a course.

4.4 If a SID ends in vectors to a fix, a VM leg followed by a CF or DF leg to that fix must be used. The heading for the VM leg must be based on source documentation. c-14

4.5 If the last fix of a SID sequence or SID Enroute Transition sequence is a fix on an Enroute Airway, the Waypoint Description Code in the Enroute Airway record for that fix must designate that fix as “Essential” or “Transition Essential.”

4.6 SID Enroute Transition legs will be coded using TF legs where possible to simplify coding. This rule does not apply if the use of TF legs would require the creation of additional waypoints.

4.7 SID Enroute Transitions published in source documentation but wholly contained in other SID Enroute Transitions will not be coded separately.

c-14 4.8 All waypoints used in SID common or Vector SIDs must be in the Enroute Waypoint File as an Off-Route Intersection unless the waypoint is also used for Enroute Airway Coding.

4.9 A SID which consists of a single path from an origination fix to a termination fix will be coded as a Route Type 2 or 5 or M.

4.10 A SID which consists of Enroute Transitions only can be coded with a single IF leg as a Route Type 2 or 5 or M, followed by the required Route Type 3 or 6 or S coding. The fix on which the IF leg is coded must be the first fix in all of the Enroute Transitions. The Transition Identifier must be coded in accordance with Chapter Five, Section 5.11. c-14

c-14 4.11 For Vector SIDs which consist of Enroute Transitions only, the coding must be a Runway Transition Route Type “V,” followed by the Enroute Transition(s), Route Type “T.” The Enroute Transition(s) must be an IF/DF leg combination with the Airport as the fix in the IF leg and the first fix of the Enroute Transition as the fix in the DF leg. The DF leg must carry a distance value equal to the total distance between the Airport and the fix along the approximated path.

4.12 When a SID Route or portion of a SID Route is repeated with different Runway Identifiers in the Transition Identifier, it must be coded as a Runway Transition Route Type of 1 or 4 or F or V (Vector SID). When a SID Route is repeated with different fix identifiers in the Transition Identifier, it must be coded as an Enroute Transition, Route Type of 3 or 6 or S or T (Vector SID). c-14

4.13 “Engine Out” SIDs must be coded as Route Type “0” only. Route Type “0” is not used in combination with other SID Route Types. The Runway Transition Identifier must contain a specific Runway Identification or Helipad Identification. All other rules for Route Type 1 and 4 apply in the coding of Route Type “0.” c-14

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PATH AND TERMINATOR

SID CODING EXAMPLE 1

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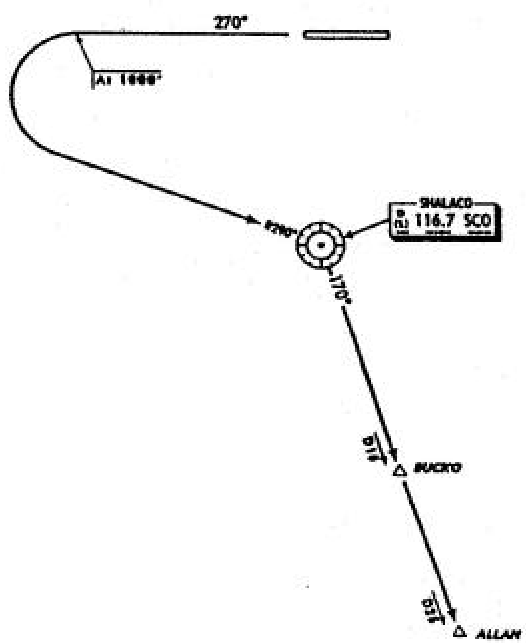
ALLAN ONE DEPARTURE(ALLAN1 • ALLAN)



SID IDENT	ROUTE TYPE	TRANS IDENT	SEQ	WAYPOINT		DESC	PATH TERM	
ALLAN1	2	RW27	010	RW27	K2 G	G	FA	Course to an Altitude
ALLAN1	2	RW27	020	SCO	K2 D	V	CF	Course to a Fix
ALLAN1	2	RW27	030	BUCKO	K2 P	E	TF	Track to a Fix
ALLAN1	2	RW27	040	ALLAN	K2 E	EE	TF	Track to a Fix

Route Type 2 = SID or SID Common Route

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ATTACHMENT 5 (cont'd)
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SDI CODING EXAMPLE 2

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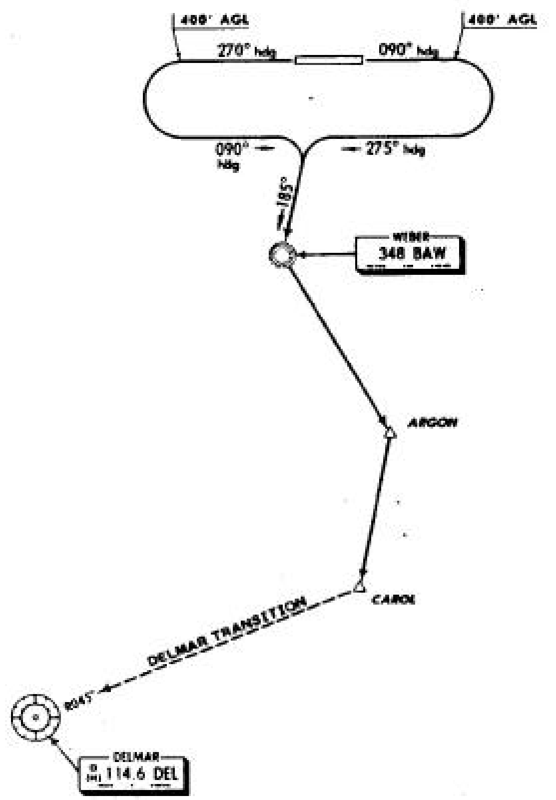
CAROL ONE DEPARTURE(CAROL1 • CAROL)



SID IDENT	ROUTE TYPE	TRANS IDENT	SEQ	WAYPOINT		DESC	PATH TERM	
CAROL1	1	RW09	010				VA	Heading to an Altitude
CAROL1	1	RW09	020				VI	Heading to an Intercept
CAROL1	1	RW09	030	BAWNB	K2 E	EE	CF	Course to a Fix
CAROL1	1	RW27	010				VA	Heading to an Altitude
CAROL1	1	RW27	020				VI	Heading to an Intercept
CAROL1	1	RW27	030	BAWNB	K2 E	EE	CF	Course to a Fix
CAROL1	2		010	BAWNB	K2 E	E	IF	Initial Fix
CAROL1	2		020	ARGON	K2 E	E	TF	Track to a Fix
CAROL1	2		030	CAROL	K2 E	EE	TF	Track to a Fix
CAROL1	3	DEL	010	CAROL	K2 E	E	IF	Initial Fix
CAROL1	3	DEL	020	DEL	K2 D	VE	TF	Track to a Fix

Route Type 1 = SID Runway Transition

Route Type 2 = SID or SID Common Route

Route Type 3 = SID Enroute Transition

Note: The route from CAROL to DEL VOR is designated as an Enroute Transition and coded as Route Type "3".

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ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

SDI CODING EXAMPLE 3

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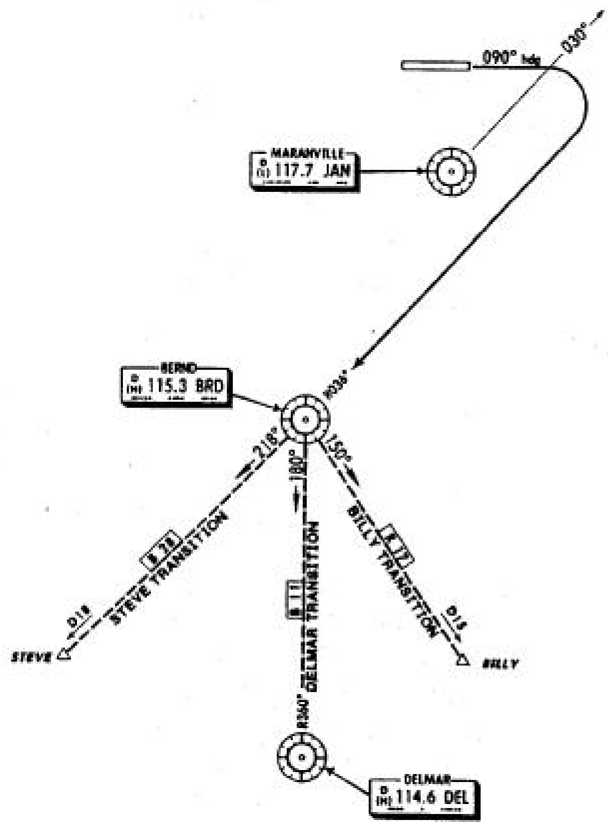
BERND NINE DEPARTURE(BRD9 • BRD)



SID IDENT	ROUTE TYPE	TRANS IDENT	SEQ	WAYPOINT		DESC	PATH TERM	
BRD9	2	RW09	010				VR	Heading to a Radial
BRD9	2	RW09	020	BRD	K2 D	VE	CF	Course to a Fix
BRD9	3	BILLY	010	BRD	K2 D	V	IF	Initial Fix
BRD9	3	BILLY	020	BILLY	K2 E	EE	TF	Track to a Fix
BRD9	3	DEL	010	BRD	K2 D	V	IF	Initial Fix
BRD9	3	DEL	020	DEL	K2 D	VE	TF	Track to a Fix
BRD9	3	STEVE	010	BRD	K2 D	V	IF	Initial Fix
BRD9	3	STEVE	020	STEVE	K2 E	EE	TF	Track to a Fix

Route Type 2 = SID or SID Common Route

Route Type 3 = SID Enroute Transition

Note: Take-off departure was coded as Route Type "2" because SID is for one runway only.

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PATH AND TERMINATOR

SDI CODING EXAMPLE 4

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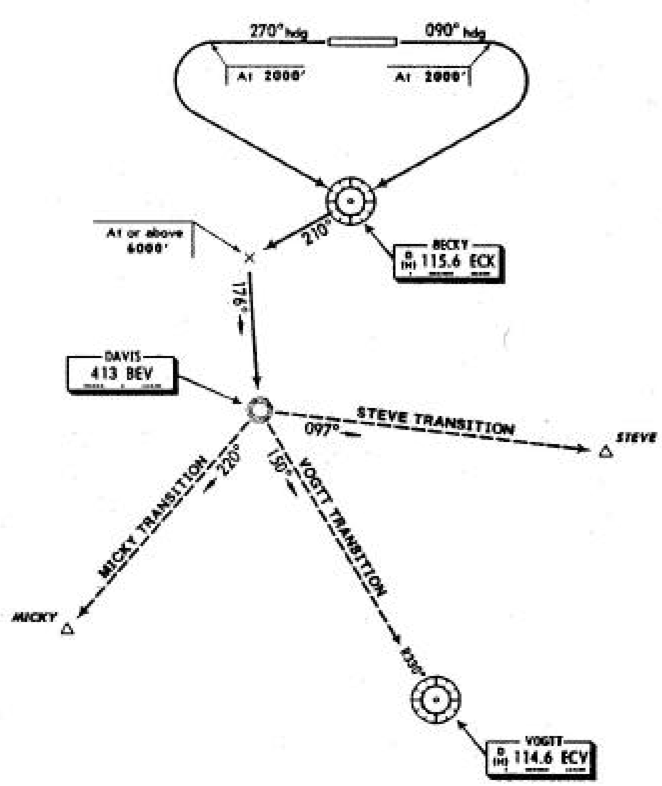
DAVIS FIVE DEPARTURE (BEV5 • BEV)



SID IDENT	ROUTE TYPE	TRANS IDENT	SEQ	WAYPOINT		DESC	PATH TERM	
BEV5	1	RW09	010				VA	Heading to an Altitude
BEV5	1	RW09	020	ECK	K2 D	VE	DF	Direct to a Fix
BEV5	1	RW27	010				VA	Heading to an Altitude
BEV5	1	RW27	020	ECK	K2 D	VE	DF	Direct to a Fix
BEV5	2		010	ECK	K2 D	V	FC	Course for a Distance
BEV5	2		020	BEVNB	K2 E	EE	CF	Course to a Fix
BEV5	3	ECV	010	BEVNB	K2 E	E	IF	Initial Fix
BEV5	3	ECV	020	ECV	K2 D	VE	TF	Track to a Fix
BEV5	3	MICKY	010	BEVNB	K2 E	E	IF	Initial Fix
BEV5	3	MICKY	020	MICKY	K2 E	EE	TF	Track to a Fix
BEV5	3	STEVE	010	BEVNB	K2 E	E	IF	Initial Fix
BEV5	3	STEVE	020	STEVE	K2 E	EE	TF	Track to a Fix

Route Type 1 = SID Runway Transition
Route Type 2 = SID or SID Common Ro
Route Type 3 = SID Enroute Transition

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ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

SID CODING EXAMPLE 5

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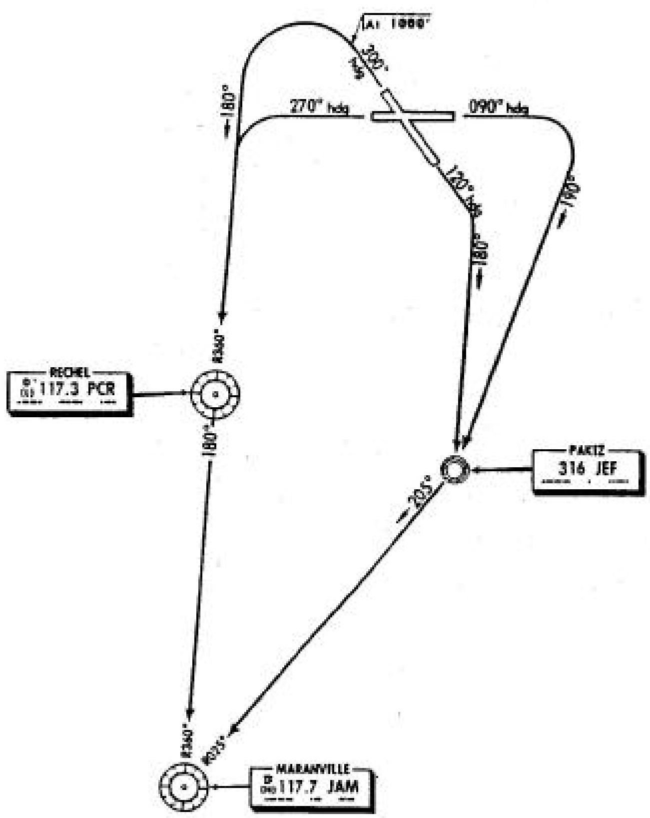
MARANVILLE FOUR DEPARTURE(JAM4 • JAM)



SID IDENT	ROUTE TYPE	TRANS IDENT	SEQ	WAYPOINT	DESC	PATH TERM	
JAM4	1	RW09	010			VI	Heading to an Intercept
JAM4	1	RW09	020	JEFNB K2 E	E	CF	Course to a Fix
JAM4	1	RW09	030	JAM K2 D	VE	TF	Track to a Fix
JAM4	1	RW12	010			VI	Heading to an Intercept
JAM4	1	RW12	020	JEFNB K2 E	E	CF	Course to a Fix
JAM4	1	RW12	030	JAM K2 D	VE	TF	Track to a Fix
JAM4	1	RW27	010			VI	Heading to an Intercept
JAM4	1	RW27	020	PCR K2 D	V	CF	Course to a Fix
JAM4	1	RW27	030	JAM K2 D	VE	TF	Track to a Fix
JAM4	1	RW30	010			VA	Heading to an Altitude
JAM4	1	RW30	020	PCR K2 D	V	CF	Course to a Fix
JAM4	1	RW30	030	JAM K2 D	VE	TF	Track to a Fix

Route Type 1 = SID Runway Transition
Route Type 2 = SID or SID Common Route

Note: Route Type "2" was not coded because there is no common route for all runways.

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ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

SID CODING EXAMPLE 6

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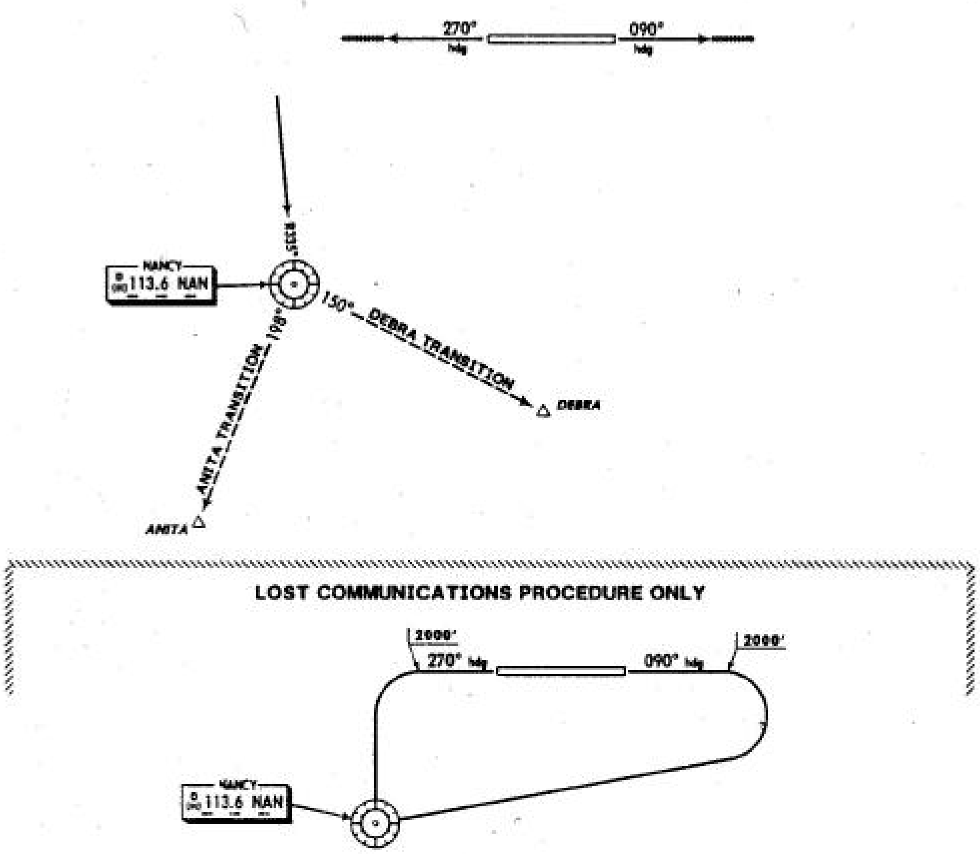
NANCY SIX DEPARTURE(NAN6 • NAN)



SID IDENT	ROUTE TYPE	TRANS IDENT	SEQ	WAYPOINT		DESC	PATH TERM	
NAN6	1	RW09	010				VM	Heading to Manual
NAN6	1	RW09	020	NAN	K2 D	VE	CF	Course to a Fix
NAN6	1	RW27	010				VM	Heading to Manual
NAN6	1	RW27	020	NAN	K2 D	VE	CF	Course to a Fix
NAN6	3	ANITA	010	NAN	K2 D	V	IF	Initial Fix
NAN6	3	ANITA	020	ANITA	K2 E	EE	TF	Track to a Fix
NAN6	3	DEBRA	010	NAN	K2 D	V	IF	Initial Fix
NAN6	3	DEBRA	020	DEBRA	K2 E	EE	TF	Track to a Fix

Route Type 1 = SID Runway Transition
Route Type 2 = SID or SID Common Route
Route Type 3 = SID Enroute Transition

Note: Route Type "2" was not coded because there is not a common route for all runways.

LOST COMMUNICATIONS Procedures are not coded in the ARINC 424 data base.

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ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

SID CODING EXAMPLE 7

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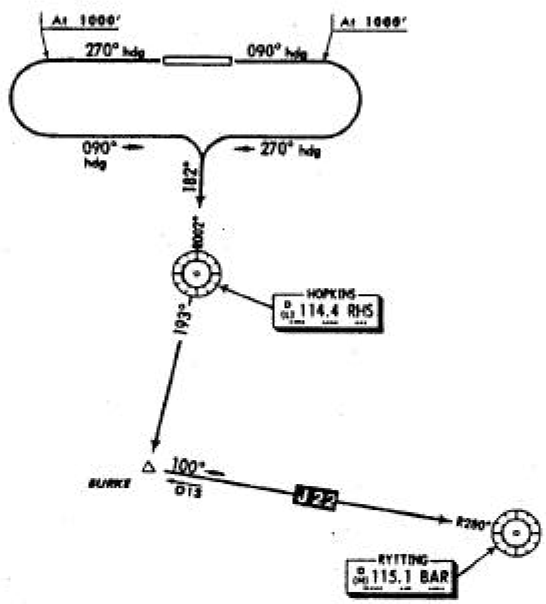
RYTTING EIGHT DEPARTURE(BAR8 • BAR)



STAR IDENT	ROUTE TYPE	TRANS IDENT	SEQ	WAYPOINT		DESC	PATH TERM	
BAR8	1	RW09	010	RW09	K2 G	G	FA	Course to an Altitude
BAR8	1	RW09	020				VI	Heading to an Intercept
BAR8	1	RW09	030	RHS	K2 D	VE	CF	Course to a Fix
BAR8	1	RW27	010	RW27	K2 G	G	FA	Course to an Altitude
BAR8	1	RW27	020				VI	Heading to an Intercept
BAR8	1	RW27	030	RHS	K2 D	VE	CF	Course to a Fix
BAR8	2		010	RHS	K2 D	V	IF	Initial Fix
BAR8	2		020	BURKE	K2 E	E	TF	Track to a Fix
BAR8	2		030	BAR	K2 D	VE	TF	Track to a Fix

Route Type 1 = SID Runway Transition
Route Type 2 = SID or SID Common Route

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PATH AND TERMINATOR

SID CODING EXAMPLE 8

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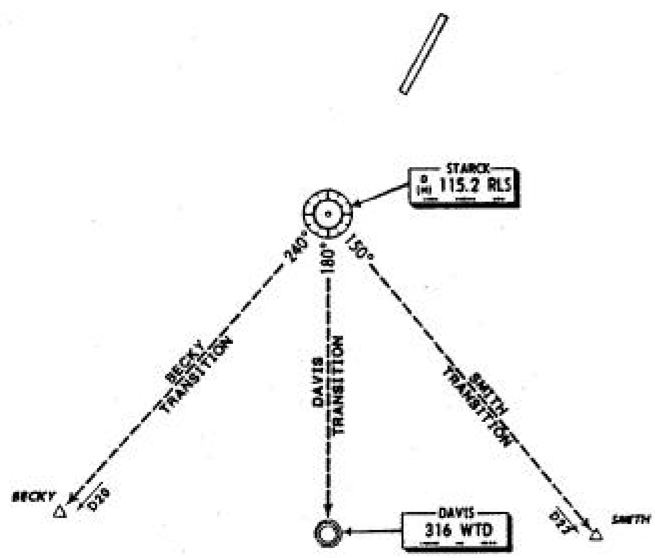
STARCK FIVE DEPARTURE(RLS5 • RLS)



SID IDENT	ROUTE TYPE	TRANS IDENT	SEQ	WAYPOINT		DESC	PATH TERM	
RLS5	2	ALL	010	RLS	K2 D	VE	IF	Initial Fix
RLS5	3	BECKY	010	RLS	K2 D	V	IF	Initial Fix
RLS5	3	BECKY	020	BECKY	K2 E	EE	TF	Track to a Fix
RLS5	3	SMITH	010	RLS	K2 D	V	IF	Initial Fix
RLS5	3	SMITH	020	SMITH	K2 E	EE	TF	Track to a Fix
RLS5	3	WTDNB	010	RLS	K2 D	V	IF	Initial Fix
RLS5	3	WTDNB	020	WTDNB	K2 E	EE	TF	Track to a Fix

Route Type 2 = SID or SID Common Route
Route Type 3 = SID Enroute Transition

Note: SIDs consisting of Enroute Transitions only require a single "IF" record coded as Route Type "2".

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ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

SDI CODING EXAMPLE 9

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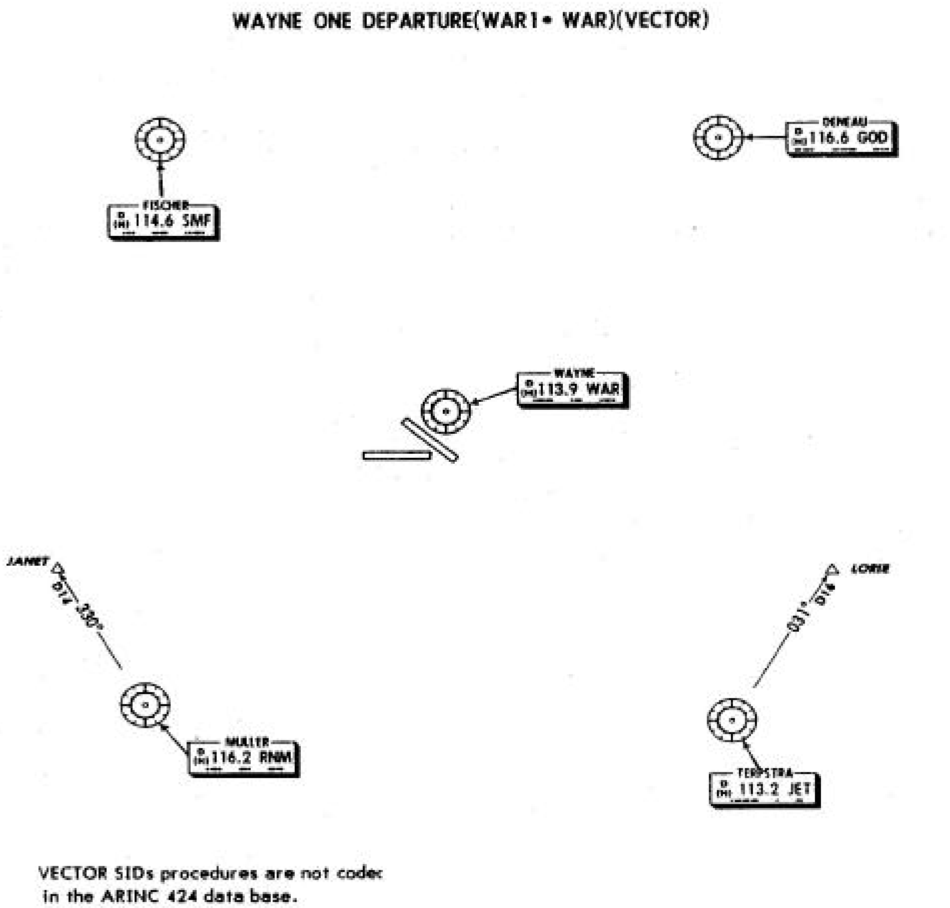

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ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

5.0 STANDARD TERMINAL ARRIVAL ROUTE (STAR) CODING RULES

5.1 If a STAR ends in vectors to a final approach (VM leg), the Airport Reference Point Record will be coded in the Waypoint Ident field of the STAR Record.

5.2 If a STAR ends in a sequence which aligns the aircraft inbound on the localizer course, the termination of the STAR sequence must be the Waypoint defined as the FACF for the localizer based Approach Procedure.

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5.3 If a STAR or Profile Descent does not begin at a fix in the source documentation, the closest named fix along the STAR or Profile Descent track must be assigned as the initial fix (IF leg) for the STAR or Profile Descent.

5.4 If no crossing altitudes are specified on intermediate fixes of a STAR or Profile Descent, a "vertical angle" will be coded in the last leg of the procedure. This angle will be computed, based on the altitudes specified at the end fixes, to provide a constant descent path through all intermediate fixes. The angle provided will ensure compliance with minimum enroute altitudes for those segments without assigned altitudes.

5.5 A STAR or Profile Descent which consists of a single path from an origination fix to a termination fix will be coded as a Route Type 2 or 5 or 8 or M.

5.6 When a STAR Route/Profile Descent Route or portion of a STAR Route/Profile Descent Route is repeated with different Runway Identifiers or different Helipad Identifiers in the Transition Identifier it must be coded as a Runway Transition Route Type 3 or 6 or 9 or S. When a STAR Route/Profile Descent Route or portion of a STAR Route/Profile Descent Route is repeated with different Fix Identifiers in the Transition Identifier, it must be coded as an Enroute Transition Route Type 1 or 4 or 7 or F.

c-14

5.7 When an Arrival Route serves the same runway or helipad as an Approach Route and the Arrival Route overlaps an Approach Transition, the Arrival Route is to be terminated at a named fix on the Approach Transition that is closest to the Final Approach Course Fix (FACF). Start the Approach Transition Route at the same fix.

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

STAR CODING EXAMPLE 1

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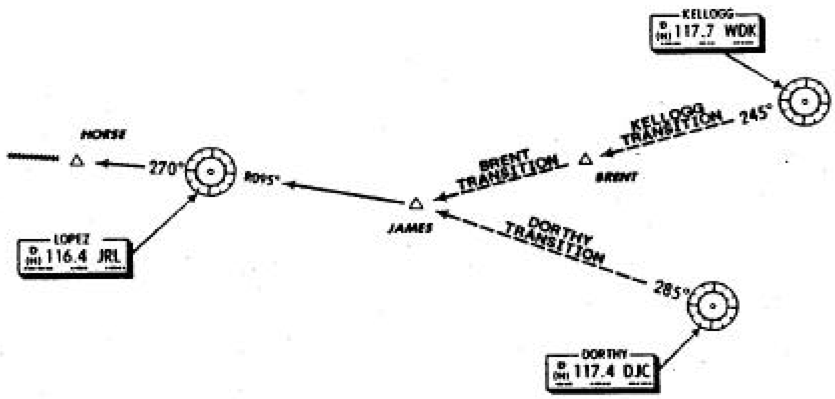
JAMES FIVE ARRIVAL(JAMES • JAMES5)



STAR IDENT	ROUTE TYPE	TRANS IDENT	SEQ	WAYPOINT		DESC	PATH TERM	
JAMES5	1	DJC	010	DJC	K2 D	V	IF	Initial Fix
JAMES5	1	DJC	020	JAMES	K2 P	EE	TF	Track to a Fix
JAMES5	1	WDK	010	WDK	K2 D	V	IF	Initial Fix
JAMES5	1	WDK	020	BRENT	K2 E	E	TF	Track to a Fix
JAMES5	1	WDK	030	JAMES	K2 P	EE	TF	Track to a Fix
JAMES5	1	BRENT	010	BRENT	K2 E	E	IF	Initial Fix
JAMES5	1	BRENT	020	JAMES	K2 P	EE	TF	Track to a Fix
JAMES5	2	ALL	010	JAMES	K2 D	E	IF	Initial Fix
JAMES5	2	ALL	020	JRL	K2 D	V	TF	Track to a Fix
JAMES5	2	ALL	030	HORSE	K2 P	E	TF	Track to a Fix
JAMES5	2	ALL	040	KDEL	K2 P	AE	VM	Heading to Manual

Route Type 1 = STAR Enroute Transition
Route Type 2 = STAR or STAR Common Route

Note: If a STAR route ends with a Vector heading, the Airport Ident is entered in the waypoint Ident field.

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ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

STAR CDOING EXAMPLE 2

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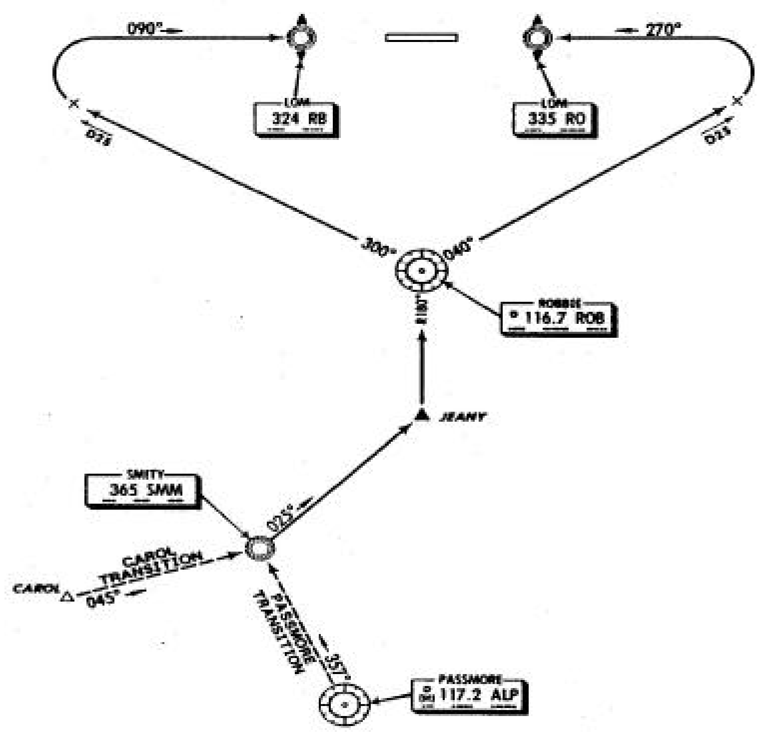
SMITY THREE ARRIVAL(SMM • SMM3)



STAR IDENT	ROUTE TYPE	TRANS IDENT	SEQ	WAYPOINT		DESC	PATH TERM	
SMM3	1	ALP	010	ALP	K2 D	V	IF	Initial Fix
SMM3	1	ALP	020	SMMNB	K2 E	EE	TF	Track to a Fix
SMM3	1	CAROL	010	CAROL	K2 E	E	IF	Initial Fix
SMM3	1	CAROL	020	SMMNB	K2 E	EE	TF	Track to a Fix
SMM3	2		010	SMMNB	K2 E	E	IF	Initial Fix
SMM3	2		020	JEANY	K2 P	EC	TF	Track to a Fix
SMM3	2		030	ROB	K2 D	VE	TF	Track to a Fix
SMM3	3	RW09	010	ROB	K2 D	V	FD	Course to a Distance
SMM3	3	RW09	020	CF09	K2 P	EE	CF	Course to a Fix
SMM3	3	RW27	010	ROB	K2 D	V	FD	Course to a Distance
SMM3	3	RW27	020	CF27	K2 P	EE	CF	Course to a Fix

Route Type 1 = STAR Enroute Transition
Route Type 2 = STAR or STAR Common Route
Route Type 3 = STAR Runway Transition

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ATTACHMENT 5 (cont'd)
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STAR CODING EXAMPLE 3

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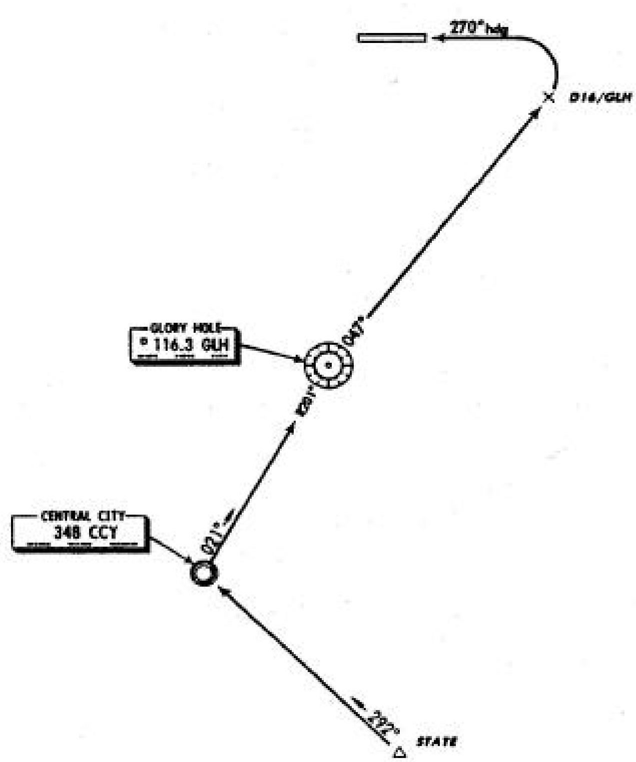
STATE FOUR ARRIVAL(STATE • STATE4)



STAR IDENT	ROUTE TYPE	TRANS IDENT	SEQ	WAYPOINT		DESC	PATH TERM	
STATE4	2	RW27	010	STATE	K2 E	E	IF	Initial Fix
STATE4	2	RW27	020	CCYNB	K2 E	E	TF	Track to a Fix
STATE4	2	RW27	030	GLH	K2 D	V	TF	Track to a Fix
STATE4	2	RW27	040	GLH	K2 D	V	FD	Course to a Distance
STATE4	2	RW27	050	CF27	K2 P	EE	CF	Course to a Fix

Route Type 2 = STAR or STAR Common Route

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ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

STAR CODING EXAMPLE 4

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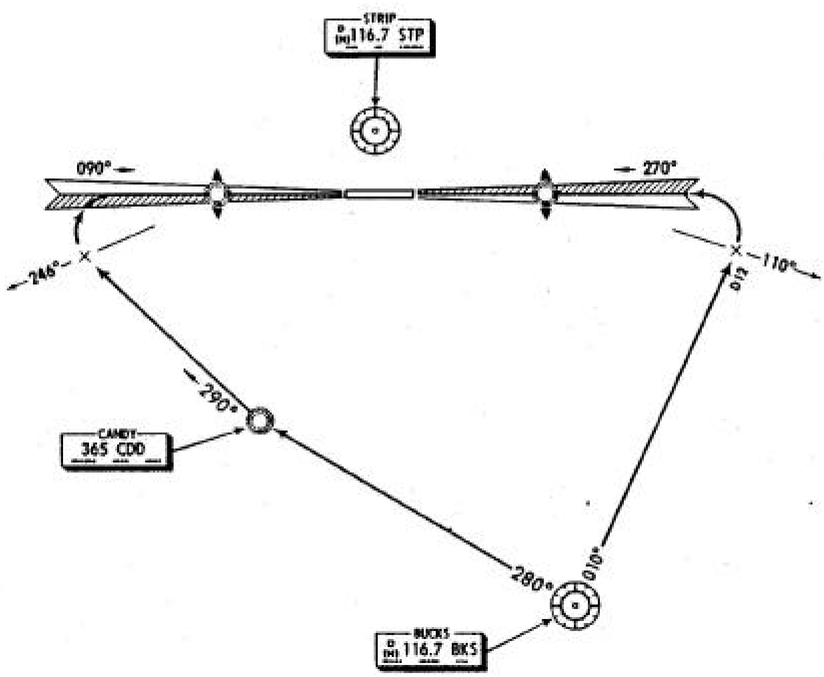
BUCKS SEVEN ARRIVAL (BUCKS • BUCKS7)



c-7

STAR IDENT	ROUTE TYPE	TRANS IDENT	SEQ	WAYPOINT		DESC	PATH TERM	
BUCKS7	3	RW09	010	BKS	K2 D	V	IF	Initial Fix
BUCKS7	3	RW09	020	CDDNB	K2 E	E	TF	Track to a Fix
BUCKS7	3	RW09	030	CDDNB	K2 E	E	FD	Course to a Distance
BUCKS7	3	RW09	040	CF09	K2 P	EE	CF	Course to a Fix
BUCKS7	3	RW27	010	BKS	K2 D	V	FD	Course to a Distance
BUCKS7	3	RW27	020	CF27	K2 P	EE	CF	Course to a Fix

Route Type 3 = STAR Runway Transition

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ATTACHMENT 5 (cont'd)
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6.0 APPROACH PROCEDURE RULES VALID FOR ALL PROCEDURE TYPES

6.1 Multiple Approach Procedure Coding

6.1.1 Multiple Approach Procedure Definition c-13

1. ILS Localizer
2. IGS Localizer
3. LDA Localizer
4. SDF Localizer
5. Localizer (Only)
6. Localizer Backcourse
7. MLS (all types)
8. RNAV
9. VORDME
10. VORTAC
11. VOR (no DME)
12. TACAN
13. NDB + DME
14. NDB
15. RNAV, GPS Required
16. FMS
17. GPS
18. LAAS-GPS/GLS
19. WAAS-GPS

Notes: GPS, GLS, RNAV, LAAS and WAAS are not facility types but rather an equipment classification. RNAV procedures use VORDME or VORTAC navaids along with the RNAV equipment. For the purpose of these rules, RNAV is to be considered a facility type. This will allow coding of a RNAV and VORDME or VORTAC procedure to the same runway or helipad. For GPS, GLS, WAAS and LAAS a GPS or GLS sensor input to the equipment is required. c-14

Circle to Land minimum version of the various approach sensors are covered through the Approach Route Qualifier (see Section 5.7). Circle-To-Land is not a facility type but rather a weather minimum criteria. For the purpose of these rules, Circle-To-Land is to be considered an equal to the procedure reference facility. This will normally rule out coding of "straight-in" and "circling" procedures using the same reference facility to one and the same runway or helipad, even though different "Route Types" are involved.

There are three types of MLS Approach, each with a unique Route Type. Normally, there will only be one approach referencing MLS to any given runway or helipad.

6.1.2 Multiple Approach Procedure Identifier c-13

Multiple approach procedures are identified by unique procedure identifiers and unique route types (refer to Sections 5.7 and 5.10 of these specifications).

6.1.3 Multiple Approach Procedure Waypoints.

Multiple approach procedures to one and the same runway or helipad may require multiple final approach segment waypoints of the same category such as FACF, FAF and missed approach point. Where such waypoints are not established with unique identifiers through source documentation, the data base supplier must create the required waypoints and assign unique identifiers, using Section 7.2.6 of this specification. c-14

6.1.4 Multiple Approach Procedure Detail.

Specific details of approach procedures such as speed, altitudes and vertical angles are considered unique for the procedure and must be coded in those records where they apply, including duplication of such detail where appropriate. c-13

6.1.5 Transitions in Multiple Approach Procedure Coding.

6.1.5.1 Approach transitions are coded to be used together with specific approach procedures. As such, a transition route must be unique to a given approach, "multiple use" with more than one approach cannot be coded. Transition routes required for more than one approach must be coded multiple times.

6.1.5.2 If an approach transition route is be coded multiple times, it must be coded with an identifier that is unique to the approach procedure for which it is to be used. c-14

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

c-13

6.2 General Rules, applicable to all Approach Route coding.

6.2.1 "Altitudes" used in approach route coding between the final approach course fix (FACF) and the runway or helipad or missed approach point will be coded in combination with Altitude Description Codes as detailed in Section 5.29 of this specification and in accordance with government source documents. This coding rule is intended to match the altitude publishing methods in official government sources which may specify altitudes as minimum, maximum, mandatory, recommended, or "At or Above to At or Below" altitude windows.

These definitions include two kinds of altitudes. One is "procedural altitudes" information on minimum altitudes at designated fixes along the final approach path. The other is the altitudes related to the Glide Slope. Procedural and Glide slope altitudes are coded in accordance with Section 5.29.

c-14

6.2.2 All fixes associated with the lateral and vertical path of approach procedures must be coded, including step-down fixes, both before and after the Final Approach Fix.

6.2.3 With the exception of the NDB + DME Approach or a Helicopter version of a NDB + DME Approach, the recommended navaid must be the same facility for all legs of a final approach (missed approach sequences not included) that require a recommended facility. The recommended navaid must be the procedure reference facility. For Approach Transition Routes, the recommended navaid will be the procedure reference facility or a VORDME or VORTAC facility. GPS approach procedures do not include a recommended navaid. GLS approach procedures will reference the GLS facility. For specific rules on recommended navaid for NDB + DME Approach Procedures, see Rule 6.8.1.4.b of this Attachment.

c-13

6.2.4 If a PI leg is from the FAF waypoint and the distance between the FACF and the FAF is less than 6.0 NM, code a CF leg after the PI, with the FACF as the fix in the CF. The route distance leg data field on the CF leg will be the difference between the distance coded on the PI leg and the distance between the FACF and FAF waypoints.

c-14

6.2.5 If no waypoint is established by source documentation for the final approach fix (FAF), one must be computed on the final approach course, using the initial approach altitude and the vertical descent angle (source or computed). For non-precision approach procedures such as VOR or NDB, the minimum distance between the FAF and the runway threshold or helipad alighting point (or MAP) will be 4 nautical miles. For Localizer based approach procedures, establish the FAF, when not provided by source, at the nominal outer marker position.

c-13

6.2.6 Straight-in Criteria, FAA type procedures

Refer to Appendix 2

6.2.7 Straight-in Criteria, ICAO type procedures

Refer to Appendix 2

6.2.8 Intentionally left blank

c-14

6.2.9 Lateral Coding Rules

All approach procedure coding must be to the published Missed Approach Point, as indicated below. Missed Approach Procedure coding must begin at that point. For missed approach procedure coding, refer to Section Nine of this Attachment. For the rules that follow, the term "runway threshold" is meant to refer either to the landing threshold point (LTP) of an actual runway or to a helipad alighting point (HAP), when the procedure is coded to a helipad.

6.2.9.1 If the published Missed Approach Point is a fix prior to the runway threshold, lateral coding is to that published Missed Approach Point.

6.2.9.2 If the published Missed Approach Point is the runway threshold, lateral coding is to the runway threshold as the published Missed Approach Point.

ATTACHMENT 5 (cont'd)
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6.2.9.3 If the published missed approach point is beyond the runway threshold and the runway threshold will be coded as a fix in the lateral path, in cases where the final approach course was designed to cross over the runway threshold, that fix will be on the established path, with no course changes.

6.2.9.4 If the published Missed Approach Point is beyond the runway threshold and no runway threshold fix has been inserted into the lateral path or the published Missed Approach Point is abeam the runway threshold, code a "Final End Point" which is calculated at a location on the final approach track where a line from the runway threshold intersects the track at a 90 degree angle. Lateral coding will still be to the published missed approach point. c-14

6.2.9.5 If the published Missed Approach Point is abeam the runway threshold, lateral coding must be to the published Missed Approach Point. c-13

Refer to the Examples 1 through 13 at the end of this section for a visual depiction of these rules. c-14

6.2.10 Vertical Coding Rules, Procedure Fix Altitudes

Vertical Approach Procedure Coding is provided through two elements, Procedure Fix Altitudes and a Vertical Angle. This section covers the Fix Altitude. Sections 7 and 8 cover the Vertical Angle for Precision and Non-Precision Approach Procedures. c-13

6.2.10.1 Procedure Fix Altitudes, Final Approach Course Fix and Final Approach Fix.

Procedure Fix Altitudes for the Final Approach Course Fix and the Final Approach Fix will be "at or above" altitudes as specified in the government source. Only government source provided altitudes will be coded on a fix coded as a FACF waypoint. If the Final Approach Fix is an established fix, rather than a published fix, and a FACF waypoint and altitude have been coded, the "at or above" altitude for the FAF must be computed using the procedures details in Sections 7 or 8 of this Attachment, depending on the type of approach being coded. If the Final Approach Fix is a published fix, code the published altitude as "at or above" in Altitude 1.

6.2.10.2 Procedure Fix Altitudes for the published Missed Approach Point, a runway threshold fix prior to the published Missed Approach Point or a Final End Point prior to the Missed Approach Point must be as indicated below.

6.2.10.2.a For a published Missed Approach Point prior to the runway threshold, an "at" altitude equal to the computed altitude at the published Missed Approach Point must be coded in Altitude 1. (See example 7)

6.2.10.2.b For a published Missed Approach Point at the runway threshold, an "at" altitude equal to the runway threshold elevation plus the published TCH must be coded in Altitude 1. If TCH is not specified by source then use 50 feet. c-14

6.2.10.2.c For a Missed Approach Point beyond the runway threshold and where the runway threshold has been included in the lateral path, code an"at" altitude equal to the runway threshold elevation plus the published TCH. If TCH is not specified by source then use 50 feet in Altitude 1 of the runway threshold fix record. Do not code an altitude on the MAP for this case.

6.2.10.2.d For a published Missed Approach Point beyond the runway threshold and no runway threshold fix is included in the lateral path, code an "at" altitude equal to the runway threshold elevation plus the published TCH. If TCH is not specified by source then use 50 feet in Altitude 1 of the "Final End Point" record. Do not code an altitude on the MAP for this case.

6.2.10.2.e For a published Missed Approach Point abeam the runway threshold, code the altitude equal to the runway threshold elevation plus the published TCH. If TCH is not specified by source then use 50 feet.

6.2.10.3 Step-down fixes will have an "at or above" altitude supplied by government source in the altitude 1 field. The altitude 2 field will have an "at" altitude equal to the computed vertical angle crossing altitude, at the step-down fix.

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c-14 6.2.11 Vertical angle information is in Section 7 and 8 of Attachment 5 in this document.

c-13 6.2.12 Missed Approach Point

c-14 In general, the design of missed approach procedures require that the runway, helipad or missed approach point be overflown prior to commencing any turn. In these cases, to ensure procedure coding reflects design specific intentions, the Overfly Indication must be coded into the Waypoint Description field. However, certain types of approach procedures design do require a turn prior to the runway, helipad or missed approach point. In these cases, to ensure procedure coding reflects design specific intentions, the Overfly Indication will not be set in the Waypoint Description field of the appropriate record.

c-13 6.3 Approach Transition Route Coding Rules

c-14 6.3.1 Recommended coding on approach transitions that end in leg to fix ("XF") is that the fix in the ending leg must be either the Final Approach Course Fix or the Final Approach Fix. If this is not the case, for example HF leg type transitions on fixes off-set from the final approach path, a series of legs must be substituted representing the original flight path, but ending with a CF or TF[1] leg type to one of these two fixes. If neither of these two coding recommendations can be followed, such as in cases where the "XF" would terminate at the missed approach waypoint or a step-down fix not associated with the lateral guidance of the final approach, the transition must be omitted.

c-13 6.3.2 When a holding pattern used for course reversal or a procedure turn is part of an approach route, it will be included in an approach transition route.

c-14 6.3.3 If an approach transition for a specific runway or helipad is common to more than one approach, that transition must be coded for each approach, with a transition identifier that must correspond to the approach procedure identifier.

6.3.4 Approach transition routes that are wholly contained in another coded transition must not be coded separately.

c-13 6.3.5 Transitions of VOR based approach procedures, TACAN based approach Procedures, and RNAV approach procedures.

6.3.5.1 Any recommended navaid used in coding must be a VOR, VORDME, VORTAC, TACAN, DME, NDB or Un-Biased ILS DME, see Section 5.23 of this document.

6.3.6 Transitions for Localizer Based Approach Procedures

c-14 6.3.6.1 The ending leg of all localizer-based transitions will either -

- end at a fix (AF, CF, HF, RF or TF)
- end in an intercept of the localizer inside the FACF (CI or VI)
- end with a manual termination at a fix (HM)

Note: An FC/CF is preferred over a TF as illustrated in Figure A5-6-1 for those legs ending at a fix.

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[1] In general "CF" legs are used in final approach coding. "TF" legs are used in FMS and GPS Approach Procedures, some types of MLS Procedures and in other procedure types where the determination has been made that a TF will work better than a CF.

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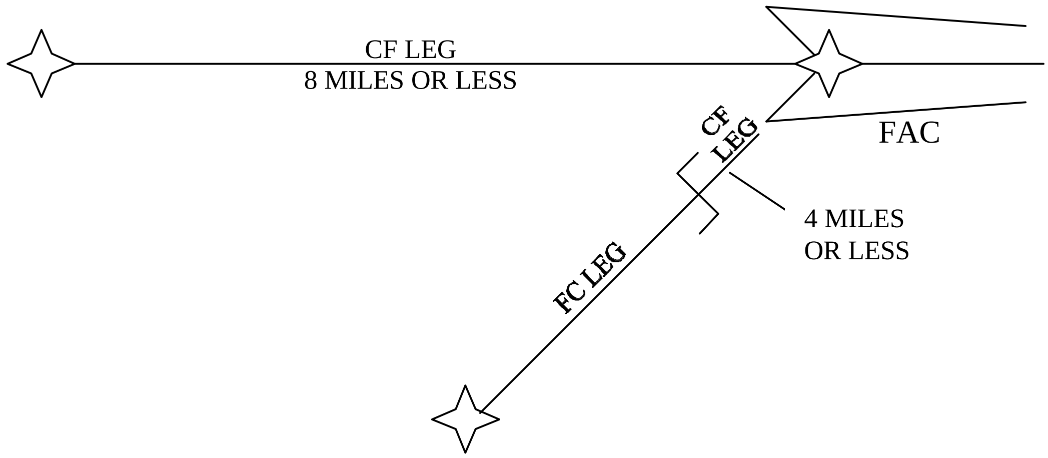

Figure A5-6-1

6.3.6.2 The ending leg of all localizer-based transitions will contain a recommended navaid -

- If CF, RF, TF, CI or VI, the recommended navaids will be the procedure referenced localizer.
- If AF, HF, HM or PI, the recommended navaid will be a VORDME or VORTAC
- The HM, HF or PI legs may use the procedure reference localizer when a VORDME or VORTAC is not available.

6.3.6.3 When the ending leg is an AF leg, the fix at the end of the leg must be the FACF.

6.3.6.4 Legs ending in an intercept will ideally be at angles of 30 degrees. Angles other then 30 degrees may be coded, provided the resulting intercept is within the reception area of the localizer. c-14

6.3.6.5 When a CF leg is used as the ending leg of a transition to a localizer-based procedure, the maximum leg distance will be within 8NM of the capture or within the reception area of the localizer as depicted in Figure A5-6-1.

6.3.6.6 When a CI or VI leg is used as the ending leg of a transition to a localizer-based procedure, the intercept will be between the FACF and the FAF, at no less than 2NM to the FAF.

6.3.7 Transitions for NDB Based Approach Procedures:

6.3.7.1 Transitions for NDB based approach procedures may use a NDB Navaid as the recommended Navaid, except for transitions that are DME Arcs. c-13

6.3.8 Transitions for MLS/GLS Approach Procedures:

6.3.8.1 MLS/GLS approach procedure coding is such that the rules can be identical to those used for Localizer based procedure coding.

6.3.9 Transitions for Circle-To-Landing Approach Procedures c-14

6.3.9.1 If the Circle-To-Land approach procedure is runway or helipad dependent, the rules on transition route coding are identical to those of the reference facility procedure type, e.g. for a VOR Circle-To-Land that is runway dependent, follow the VOR based approach procedure rules for approach transition route coding.

6.3.9.2 If the Circle-To-Land approach procedure is not runway or helipad dependent, being valid for more than one landing direction, the rules for coding approach transitions routes are as follows.

6.3.9.3 Recommended navaids used in coding all legs except ending legs must be a VOR, VORDME, VORTAC, DME or Un-Biased ILSDME. For the ending leg sequences, the recommended navaid, where required, must be the procedure reference facility, see Section 5.23 of this document. c-13

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6.4 Localizer Based Approach Procedure Coding

6.4.1 The following rules apply to the coding of the "final approach segment" of all Localizer based approach procedures. Localizer based approach procedures include Full ILS (Localizer and GS), Localizer only, IGS (Instrument Guidance System), LDA (Localizer type Directional Aid) and SDF (Simplified Directional Aid) procedures.

6.4.1.1 All Localizer based approach procedures must begin at the FACF. They must consist of a FACF, FAF and runway Fix (precision approach) or missed approach point fix (non-precision approach). A Runway Centerline Intercept (RCI) point may be coded in some non-precision, Localizer based procedures.

6.4.1.2 The FACF is defined as a fix located on the localizer beam center, 8NM or less from the FAF or within the reception range of the Localizer. This may be a source document provided fix or a fix created using these positioning rules.

6.4.1.3 The FACF is coded as an IF leg with an altitude assigned, based on the source document or equal to the altitude of a procedure turn or the altitude of the last transition leg.

c-13 6.4.1.4 The track from the FACF to the FAF is coded as a CF or a TF leg with altitude constraints as indicated for the specific procedure types below.

6.4.1.5 The recommended navaid will be the procedure reference localizer. Theta and Rho will be provided from the localizer for each sequence of the final approach, including the runway fix and/or missed approach point.

6.4.1.6 The "Outbound Magnetic Course" field in all sequences will be equal to the localizer magnetic bearing, rounded to the nearest whole degree, derived from official government source.

6.4.2 Full ILS (Localizer and Glide Slope) Precision Approach Procedure

6.4.2.1 For full ILS procedures, code the glide slope intercept altitude in the altitude 2 field of the FAF record, if an intercept altitude is required. If the procedure requires a constant descent from the FACF to the runway, then altitude 2 will be blank.

6.4.2.2 For full ILS procedures, a missed approach point beyond the runway is not allowed, therefore rules 6.2.9.3, 6.2.9.4, 6.2.9.5, 6.2.10.2.c, 6.2.10.2.d, and 6.2.10.2.e do not apply.

6.5 MLS Approach Procedure Coding

MLS Approach Procedure Code utilizing raw azimuth and elevation data is limited to those procedures which are designed as a localizer equivalent. If such a procedures is coded, the rules for the "final approach segments" are to be identical with those stated in Section 6.4 above. The Route Type of such approaches will be coded as "M" in column 20 of the primary approach record. Approach procedures predicated on the use of MLS Area Navigation (MLS/RNAV) will be coded with a "W" or "Y" in column 20 of the primary approach record. MLS/RNAV approaches are coded as described below.

There are three types of MLS/RNAV approaches, listed in increasing level of complexity, computed lateral/raw vertical guidance, computer lateral and vertical guidance and curved path.

6.5.1 Approaches using computed lateral path and raw vertical path guidance, also referred to as Type "A," will be used primarily where the MLS azimuth transmitter cannot be located on the extended runway centerline, but the elevation transmitter is sited normally abeam the touchdown point. All legs will be straight and aligned with the inbound course. The will be codes with Route Type "W" in column 20 of the primary approach record. Path definition will be the equivalent of a full ILS approach (6.4.2) with the exception that the leg from the PFAF inbound will be a "TF" leg, terminating at the runway waypoint, with the published final approach source in the Outbound Magnetic Course field. The PFAF will be coded as the Final Approach Fix in the Waypoint Description field and the first fix prior to the PFAF will be coded as the Final Approach Course Fix.

6.5.2 Approach using computed lateral and vertical guidance by no curved legs, also referred to as Type "B," will be coded as Route Type "Y" in column 20 of the primary approach record. All legs will be straight and aligned with the inbound course. Path definition will be the equivalent of the full ILS approach (6.4.2) with the exception that the leg from the PFAF inbound will be a "TF" leg, with the published final approach course in the Outbound Magnetic Course field. The altitude of the PFAF and all waypoints inbound from it will be the glide path altitude at that point. The PFAF will be coded as the Final Approach Fix in Waypoint Description field and the first fix prior to the PFAF will be coded as the Final Approach Course Fix.

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6.5.3 MLS/RNAV approaches using curved legs, also referred to as Type "C," will be used for a variety of reasons, including parallel sidestep approaches, separation of different categories of aircraft, noise abatement, etc. These will always be precision approaches. They will be coded a with a Route type of "Y" in column 20 of the primary approach record. The following rules apply:

6.5.3.1 The first leg of an MLS/RNAV approach with curved legs will be an "IF/TF" leg combination. All other straight legs will be coded as "TF" legs. All "TF" legs in an MLS/RNAV with curved legs procedure will have the published course included in the Outbound Magnetic Course field.

6.5.3.2 All curved legs will be coded as "RF" legs. Every leg preceding or following an "RF" leg will be tangent to the "RF" leg at that point and the overfly bit will be set for those waypoints.

6.5.3.3 The initial portion of a MLS/RNAV approach with curved legs may be an "IF/RF" combination provided a straight leg approach transition is coded to the point in the "IF" and the rules in Section 6.5.2 are complied with.

6.5.3.4 The PFAF will be coded as the Final Approach Fix in the Waypoint Description field and the first fix prior to the PFAF will be coded as the Final Approach Course Fix. If there is not a fix at the glide path intercept, then the first fix after the intercept will be the PFAF. There must be one and only one PFAF for each MLS/RNAV approach with curved legs.

6.5.3.5 The last leg of an approach transition prior to an MLS/RNAV approach will be one of the following types CF, CI, HF, PI, RF or TF, except as indicated in Section 6.5.3.3. If the leg type is CF, CI, RF or TF, then the Recommended Navaid will contain the identifier of the MLS used for the approach. If the leg type is PI or HF, then the Recommended Navaid will contain the VHF Navaid the defines the PI or HF leg.

6.5.3.6 If the last leg prior to the approach is a "CI" leg, the intercept angle will be 300 or less, and the intercept point will be between the first and second terminator fixes in the approach, but no closer that 2NM to the second fix.

6.5.3.7 The PFAF and the FACF altitudes will be coded according to the rules outlined for Precision Approach Procedures in Section 6.4.2. c-13

6.5.4 The PFAF will be used in precision MLS/RNAV approaches. It is defined as that fix along the lateral path where the published barometric altitude intercepts the glide slope. Prior to the PFAF, the aircraft is expected to fly barometric altitude to intercept the glide path. All waypoints up to the PFAF should be coded using the published barometric crossing altitude. The PFAF and all waypoints after it should be coded using the true altitude of the glide path at those points.

6.6 <u>VOR, VORDME, VORTAC and RNAV Approach Procedure Coding</u>

The following rules apply to the coding of the "final approach segment" of all VOR based approach procedures, regardless of the reference facility type, and to RNAV Procedures.

6.6.1 Reference Facility Specific Rules

The following rules apply to the coding of the "final approach segment" of specific reference facility VOR based approach procedures.

6.6.1.1 When the reference facility is VOR Only or there is no DME collocated with VOR (see VOR coding examples 1, 3 and 8), the following applies:

6.6.1.1.a Final approach segments will be coded using IF and CF or TF legs only.

6.6.1.1.b Final approach must include either a FAF and a runway fix or FAF and missed approach point fix.

6.6.1.1.c The recommended navaid will be the procedure reference VOR. Theta values will be provided from that facility in all final approach sequences.

6.6.1.2 When the reference facility is VORDME or VORTAC (see VOR coding examples 2 and 6), the following applies:

6.6.1.2.a Final approach segments will be coded using IF and CF or TF legs only.

6.6.1.2.b Final approach must include FACF, FAF and either a runway fix or missed approach point fix.

6.6.1.2.c The recommended navaid will be the procedure reference VORDME or VORTAC. Theta and Rho values will be provided from that facility in all final approach sequences.

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6.6.2 Examples of VOR Coding

6.6.2.1 Example of missed approach point before the runway threshold, refer to VOR coding examples 7 and 8.

6.6.2.2 Example of missed approach point at the runway threshold, refer to VOR coding example 1 and 2.

6.6.2.3 Example of missed approach point beyond the runway threshold and the final course passes over the runway threshold, refer to VOR coding examples 3 and 4.

6.6.2.4 Example of missed approach point beyond the runway threshold and the final approach course does not cross runway threshold, refer to VOR coding examples 5 and 6.

6.6.3 RNAV Procedures

6.6.3.1 All RNAV approach procedures will be coded to a runway threshold as the last leg in the final approach. The runway threshold may be a source defined named waypoint.

6.6.3.2 The recommended navaid will be the procedure reference VORDME or VORTAC. Theta and Rho values will be provided from that facility in all final approach sequences.

6.6.3.3 Final approach segments will be coded using IF and CF or TF legs only.

6.6.3.4 Final approach must include either a FAF and a runway fix or FAF and missed approach point fix.

c-13 6.7 <u>TACAN Approach Procedure Coding</u>

The following rules apply to the coding of the "final approach segment" of all TACAN based approach procedures, regardless of the reference facility type.

6.7.1 TACAN approach procedures will only be coded into a data base when:

6.7.1.1 No other VHF navaid based approach procedure that can be coded has been published by official source for the runway in question.

6.7.1.2 The runway in question and the associated airport can be supported as defined in this specification.

6.7.2 When the reference facility is TACAN (see VOR Coding example 9), the following applies:

6.7.2.1 Final approach segments will be coded using IF and CF or TF legs only.

6.7.2.2 Final approach must include FACF, FAF and either a Runway Fix or Missed Approach Point Fix.

6.7.3 The Recommended Navaid will be the procedure reference TACAN. Theta and Rho values will be provided from that facility in all final approach sequences.

6.7.4 Vertical Angle Rules

Vertical angle will be coded per the rules in Section 6.2.11.

6.8 <u>NDB Approach Procedure Coding</u>

The following rules apply to the coding of the "final approach segment" of all NDB based approach procedures. NDB based approach procedures include procedures using a NDB or Locator as the reference facility and procedures using a NDB or Locator and a DME (NDB + DME) as reference facilities. NDB approach procedures not requiring DME but using the DME for reduced minimums will be coded as NDB + DME procedures.

6.8.1 Specific Reference Facility Rules

The following rules apply to the coding of the "final approach segment" of specific reference facility NDB based approach procedures.

6.8.1.1 NDB approach procedures must include at least FAF and a runway fix or missed approach point fix.

6.8.1.1.a If no waypoint is established by source for the FAF, one may be established on the final approach course using the initial approach altitude, the computed vertical descent angle and a distance to the runway threshold or missed approach point of not less than 4NM.

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6.8.1.2 NDB + DME approach procedures must include a FACF, FAF and runway fix or missed approach point fix.

6.8.1.3 Coding will use IF and CF or TF legs only through to the runway fix or missed approach point fix. The IF leg will be at the FAF for NDB procedures or at the FACF for NDB + DME procedures.

6.8.1.4 Recommended Navaid Requirements

6.8.1.4.a On NDB procedures, the recommended navaid information will be provided on the FACF (where coded), the FAF and the Missed Approach Fix record. It will be the procedure reference NDB or Locator. Theta and Rho information will not be provided on any sequence.

6.8.1.4.b On NDB + DME procedures, the recommended navaid information will be provided on all sequences. On the FACF and FAF, this navaid will be the procedure reference NDB or Locator. On the runway fix or missed approach point fix, the recommended navaid will be the procedure reference DME. A procedure reference DME may be any navaid with DME, including ILSDMEs. The Theta and Rho information will not be provided in any sequence of the NDB + DME final approach except in the runway fix or missed approach point fix sequence. That sequence will include Rho information from the procedure reference DME Navaid. c-13

6.8.2 Examples of NDB Coding

6.8.2.1 Example of missed approach point before the runway threshold, refer to NDB coding example 4.

6.8.2.2 Example of missed approach point at the runway threshold, refer to NDB coding example 1.

6.8.2.3 Example of missed approach point beyond the runway threshold and the final course passes over the runway threshold, refer to NDB coding example 2.

6.8.2.4 Example of missed approach point beyond the runway threshold and the final approach course does not cross runway threshold, refer to NDB coding example 3.

6.9 Loran Coding rules Deleted by Supplement 14 c-14

6.10 Circle-To-Land Approach Procedure Coding

6.10.1 Circle-To-Land approach procedures may be coded for the following types of specific reference facilities:

a. Localizer Only
b. Localizer Backcourse
c. IGS Procedure
d. LDA Procedure
e. SDF Procedure
f. VOR Procedure
g. NDB Procedure

6.10.2 Circle-To-Land approach procedures may be coded referencing a specific runway or not referencing a specific runway. Coding rules to be followed are: c-13

6.10.2.1 Use the coding rules for the reference facility type if the circle-to land is runway dependent.

6.10.2.2 The Circle-To-Land coding rules if the circle-to-land is not runway dependent.

6.10.3 The following are the Circle-To-Land coding rules for all types of valid reference facilities:

6.10.3.1 The last segment in the final approach sequence will be the missed approach point fix.

6.10.3.2 The Altitude 1 value in the missed approach point fix segment will be the highest published OCH(A) or MDA for the procedure.

6.10.3.3 The vertical angle information will be in the missed approach point fix segment and will be coded as "0.00."

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6.11 FMS and GPS Procedure Coding

The following rules apply to the coding of the "final approach segments" of all FMS and GPS Approach Procedure Coding.

6.11.1 Lateral Guidance Rules

For FMS and GPS procedures, a missed approach point beyond the runway is not allowed, therefore rules 6.2.9.3, 6.2.9.4, 6.2.9.5, 6.2.10.2.c, 6.2.10.2.d, and 6.2.10.2.e do not apply.

6.11.2 The track from the FACF to the FAF, where an FACF exists, is coded with TF or RF legs. The RF leg is not allowed as the first leg of the approach coding according to the Beginning/Ending Leg Table. The preferred coding when an approach starts with a precision arc is "IF" at the FACF, followed by "RF" to the FAF. According to the rules on "RF" legs, this will require that a straight line, fix terminated approach transition to the FACF has been included. The track in the transition must be tangent to the arc and the fix at the end of the transition must be overflown. The rule also does not exclude the use of an RF leg in between FAF and the final TF leg of the approach. Such RF legs will be coded with the 4th character of the Waypoint Description field blank.

c-13 6.12 Helicopter Procedure Coding

The following rules apply to the coding of the "final approach segment" of all Helicopter Approach Procedure Coding. These rules cover Helicopter Approach Procedures which may be coded to Airports and Runways included in Sub-sections PA and PG only.

6.12.1 Helicopter Approach Procedures will be coding using the rules in Section 6 of this Attachment, appropriate to the type of sensor required for the procedure, such as VORDME or ILS or RNAV. This includes rules for Recommended Navaid, FACF requirements and leg types.

6.12.2 The Lateral Path Rules for the sensor related procedure coding reference a "runway fix" as a missed approach point or a missed approach point. Those same rules apply to helicopter procedures. For procedures designed with a dedicated helipad as the missed approach point, a Terminal Waypoint will be established and used as the missed approach point fix.

6.12.3 The Vertical Path Rules in Section 6 apply without exception, using the rules appropriate for the sensor type.

6.12.4 Missed Approach code will be accomplished according to the rule in Section 7 of this Attachment, appropriate for the sensor type.

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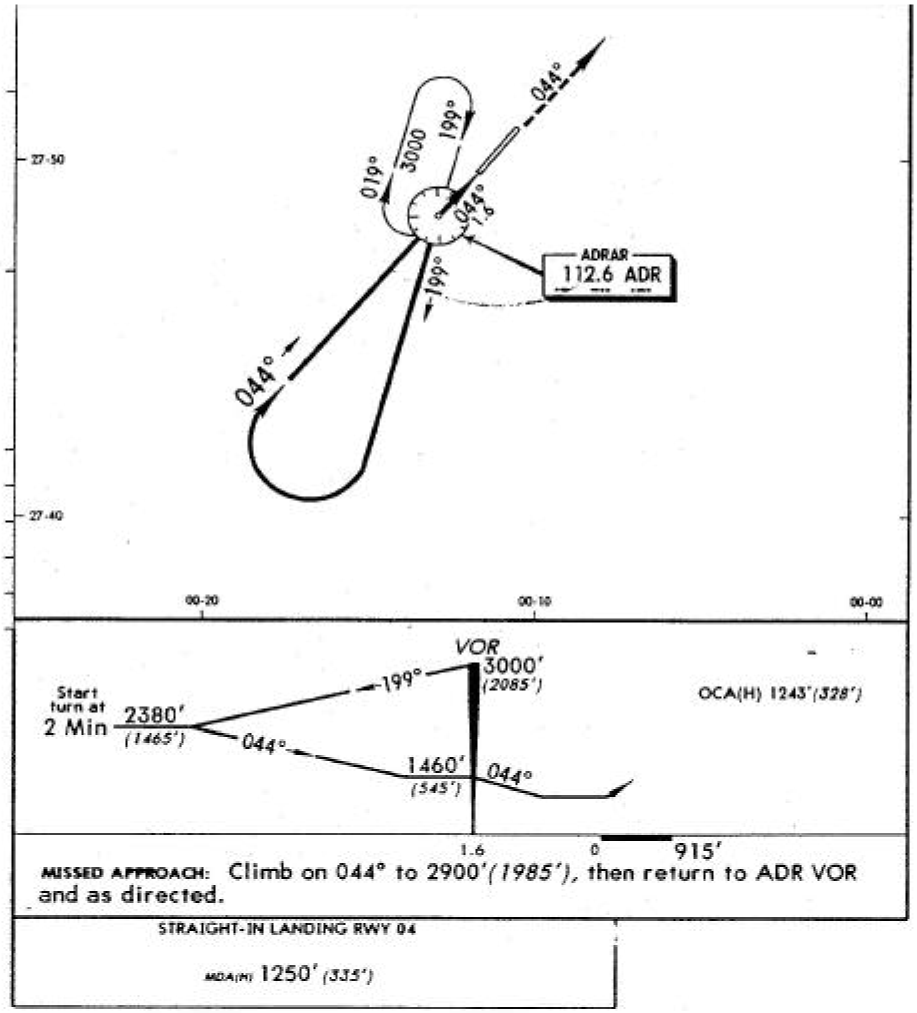
VOR CODING EXAMPLE 1

Excerpted from Jeppesen Chart Adrar, Algeria, VOR Rwy 04 Approach Chart by permission of Jeppesen Sanderson, Inc.

Not for navigational or other operational use. For example only. Please consult current navigation charts.



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V04	020	ADR	CF	ADR	V_F	0000	0440	0034	01460	
V04	030	RW04	CF	ADR	G__	0016	0440	0016	00965	-300
V04	040		VA		_M_		0440		02900	
V04	050	ADR	DF		VE_					

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VOR CODING EXAMPLE 2

Excerpted from Jeppesen Chart Agadir, Morocco, VOR Rwy 28 Approach Chart by permission of Jeppesen Sanderson, Inc.

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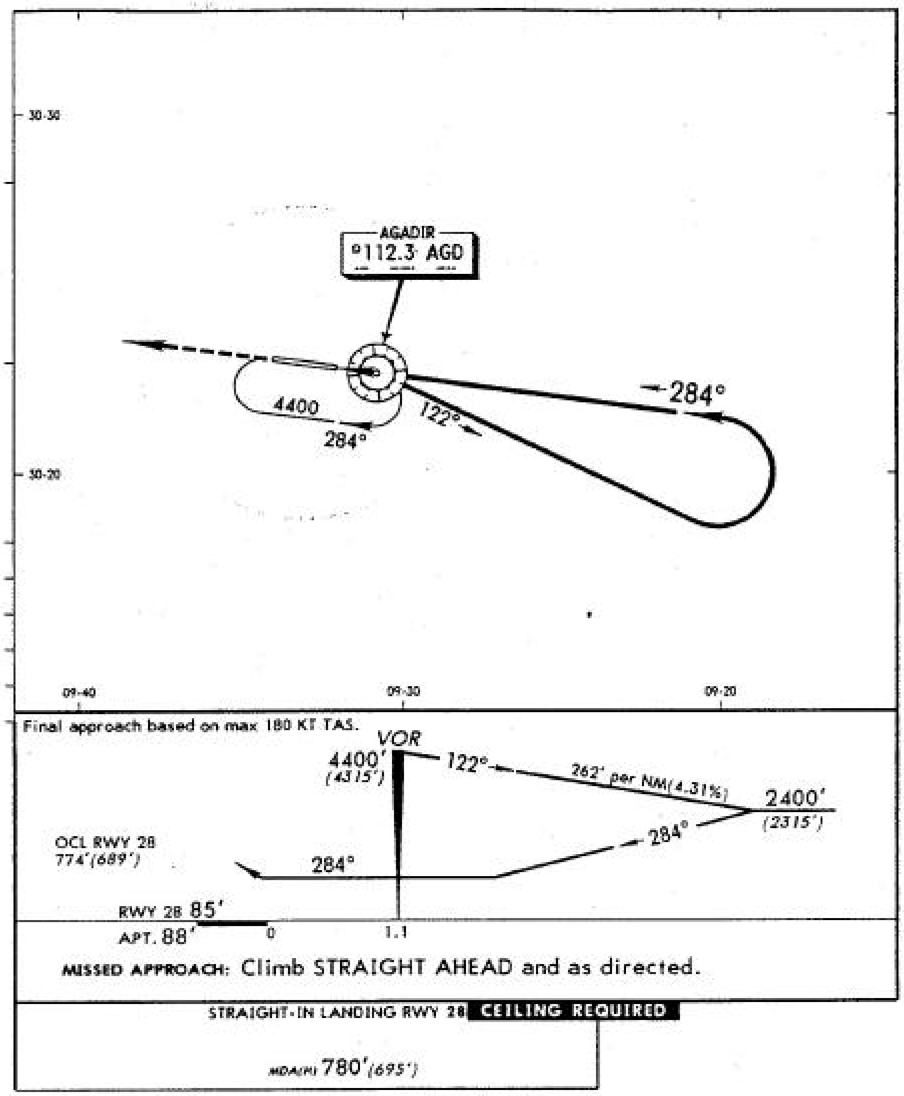

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V28	020	AGD	CF	AGD	V_F	0000	2840	0076	00486	
V28	030	RW28	CF	AGD	G___	0011	2840	0011	00135	-300
V28	040		VA		__M_		2840		00488	
V28	050		VM		EE__		2840			

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VOR CODING EXAMPLE 3

Excerpted from Jeppesen Chart Annaba, Algeria, VOR Rwy 28 Approach Chart by permission of Jeppesen Sanderson, Inc.

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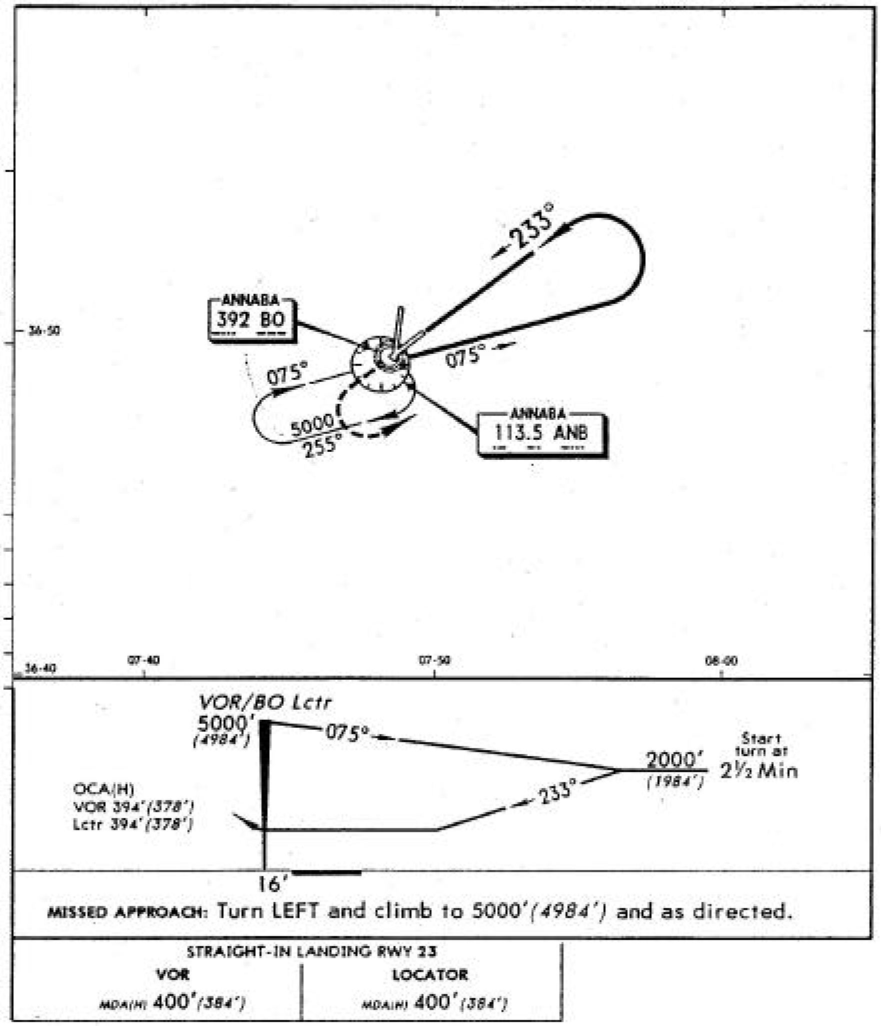

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V23	030	RW23	CF	ANB	G___	0017	2330	0063	00066	-301
V23	040	ANB	CF	ANB	V_M	0000	2330	0017	00400	
V23	050		VM		_E_		2330		05000	

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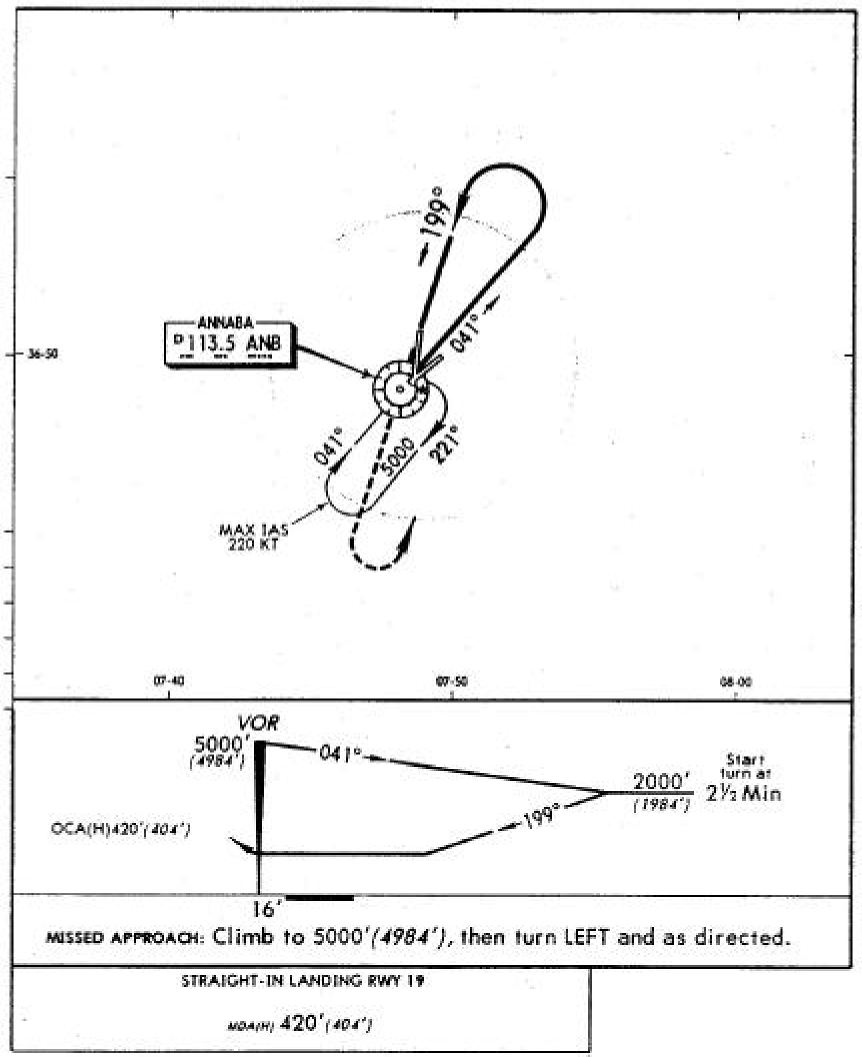
VOR CODING EXAMPLE 4

Excerpted from Jeppesen Chart Annaba, Algeria, VOR Rwy 19 Approach Chart by permission of Jeppesen Sanderson, Inc.

For illustration only. Not intended for use in navigation.



APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
V19	020	FF19	IF	ANB	E_F	0080			02000	
V19	030	RW19	CF	ANB	G__	0020	1990	0061	00066	-300
V19	040	ANB	CF	ANB	V M_	0000	1990	0020	00420	
V19	050		VM		_E__		1990		05000	

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

VOR CODING EXAMPLE 5

Excerpted from Jeppesen Chart Alicante, Spain, VOR Rwy 29 Approach Chart by permission of Jeppesen Sanderson, Inc.

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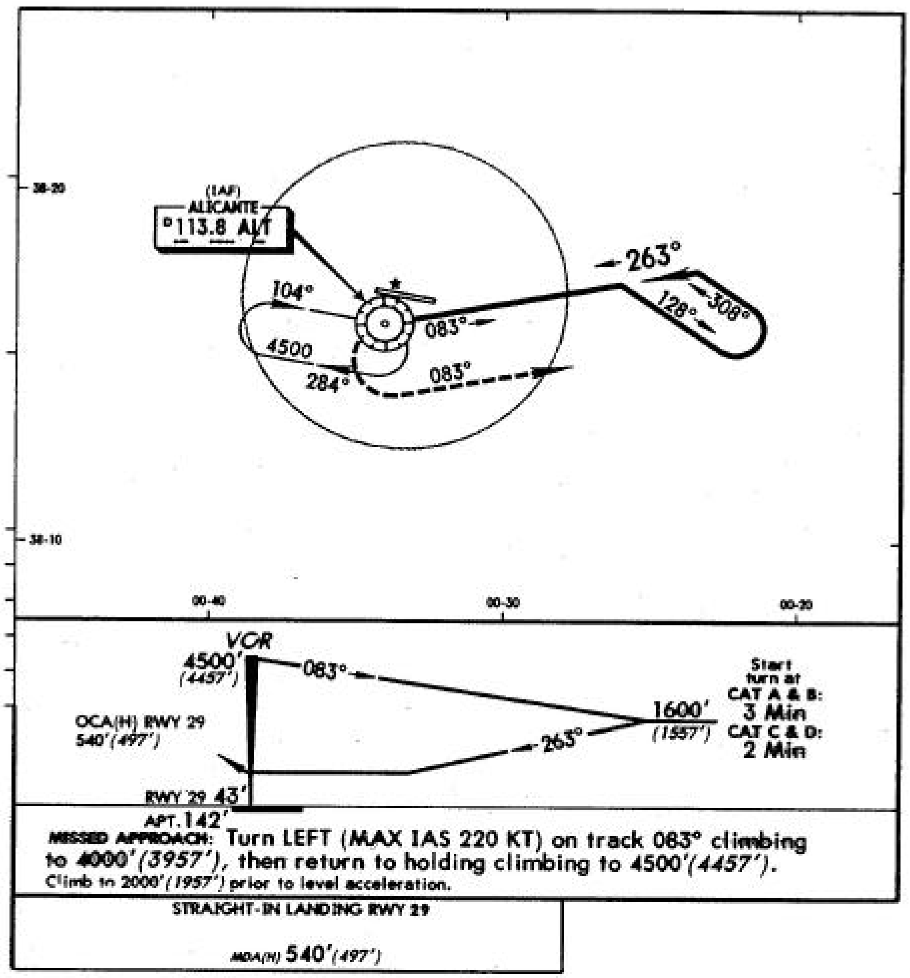

APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
V29	020	FF29	IF	ALT	E_F	0070			01600	
V29	025	RC29	CF	ALT	R_L	0026	2630	0044	00483	
V29	030	ALT	CF	ALT	V_M	0000	2630	0026	00540	000
V29	040		VA		__M_		2630		00542	
V29	050		VA				0830		04000	
V29	060	ALT	DF		V___				04500	
V29	070	ALT	HM		VE_H		1040	001T	04500	

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

VOR CODING EXAMPLE 6

Excerpted from Jeppesen Chart Baldonnel, Ireland, VORDME Rwy 11 Approach Chart by permission of Jeppesen Sanderson, Inc.

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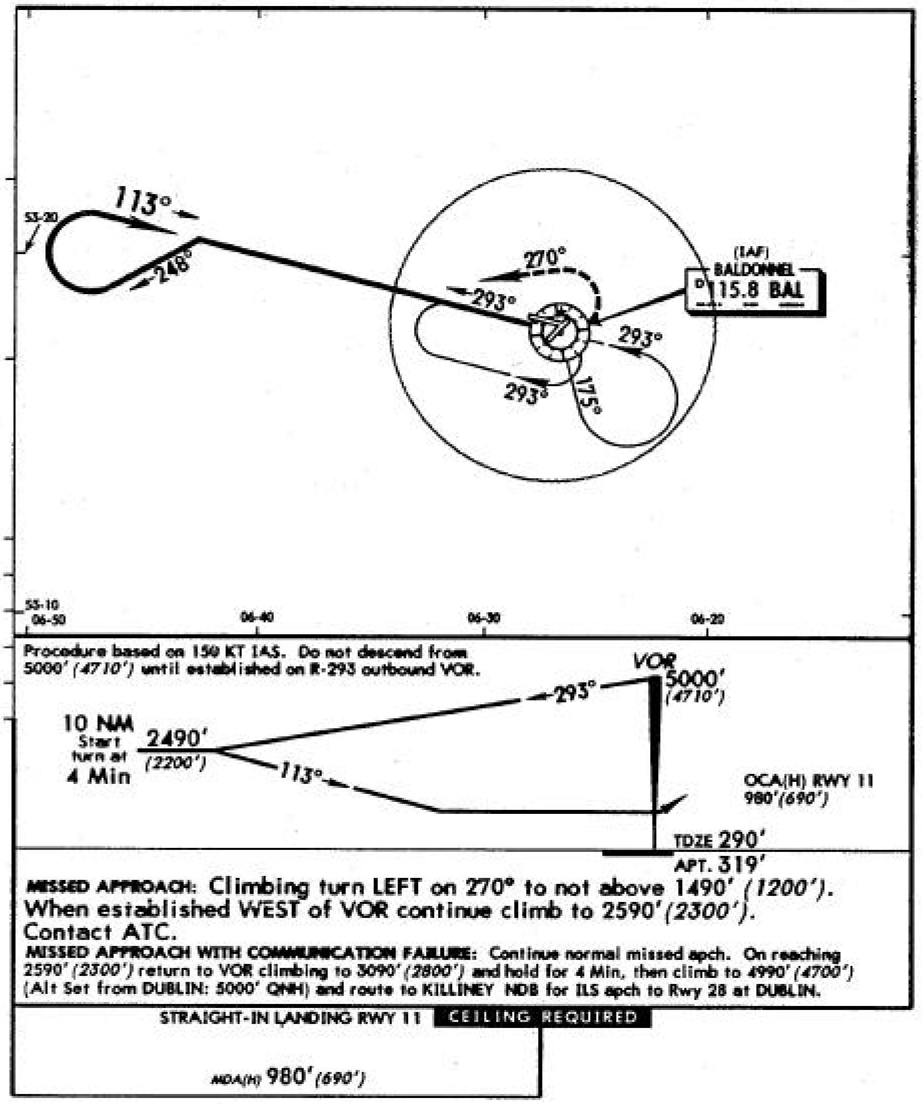

APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
V11	010	CF11	IF	BAL	E_I	0110			02490	
V11	020	FF11	CF	BAL	E_F	0060	1130	0050	01830	
V11	025	RC11	CF	BAL	R_L	0029	1130	0035	00974	
V11	030	BAL	CF	BAL	V_M	0000	1130	0015	00980	000
V11	040		VA		_M_		1130		00980	
V11	050		VM		_E_		2700		01490	

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

VOR CODING EXAMPLE 7

Excerpted from Jeppesen Chart Aleppo, Syria, A. R. VORDME Rwy 27 Approach Chart by permission of Jeppesen Sanderson, Inc.

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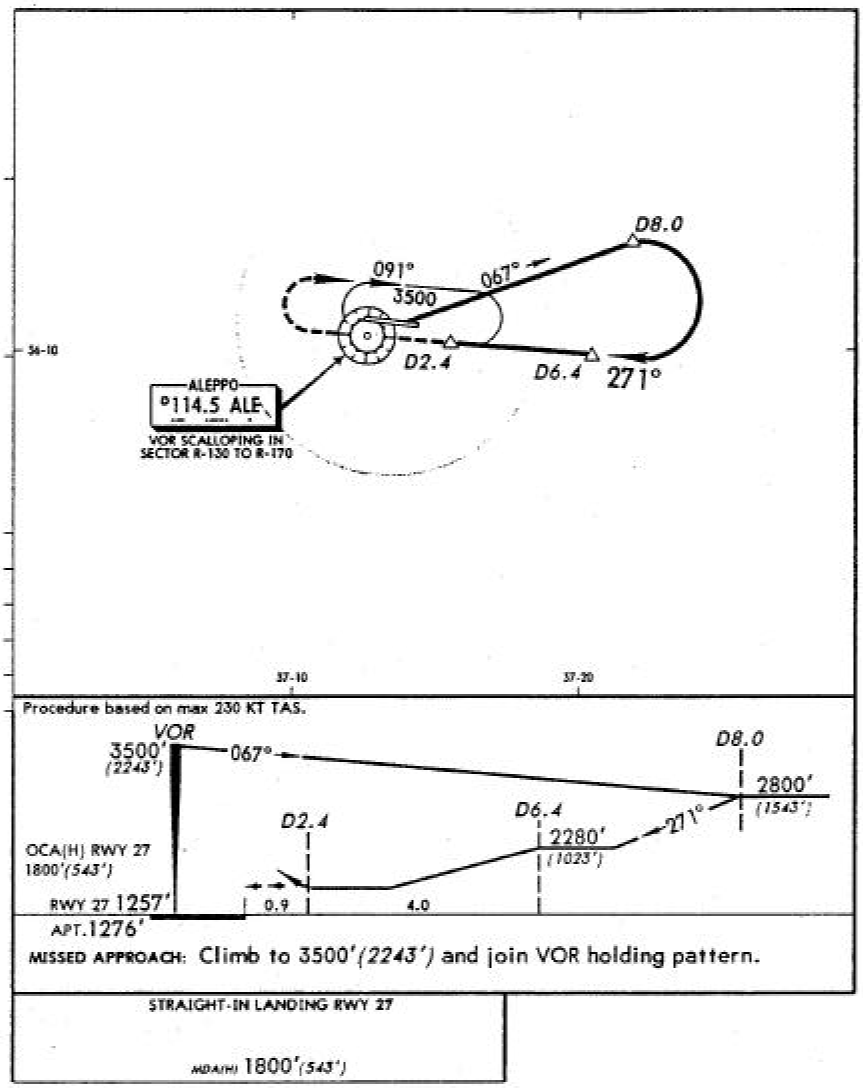

APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
V27	020	FF27	IF	ALE	E_F	0064			02280	
V27	030	MA27	CF	ALE	E_M	0024	2710	0040	01800	-300
V27	040		VA		_M_		2710		03500	
V27	050	ALE	DF	ALE	V__	0000				
V27	060	ALE	HM	ALE	VE_H	0000	2710	001T	03500	

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

VOR CODING EXAMPLE 8

Excerpted from Jeppesen Chart Al Hoceima, Morocco, VOR Rwy 18 Approach Chart by permission of Jeppesen Sanderson, Inc.

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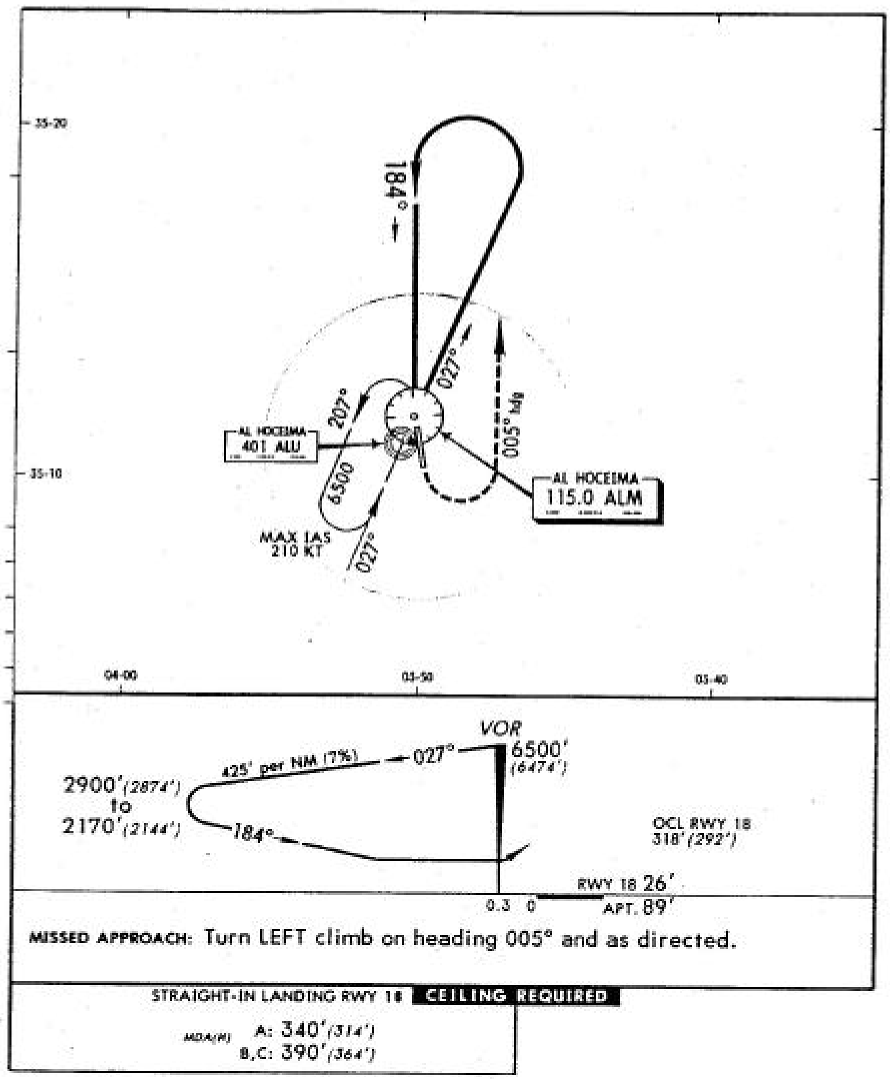

APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
V18	020	FF18	IF	ALM	E_F	0070			02170	
V18	030	ALM	CF	ALM	V_M	0000	1840	0070	00390	-300
V18	040		VA		_M_		1840		00489	
V18	050		VM		_E_		0050			

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

VOR CODING EXAMPLE 9

Excerpted from Jeppesen Chart Elgin AFB, Illinois, USA, TACAN Rwy 01 Approach Chart by permission of Jeppesen Sanderson, Inc.

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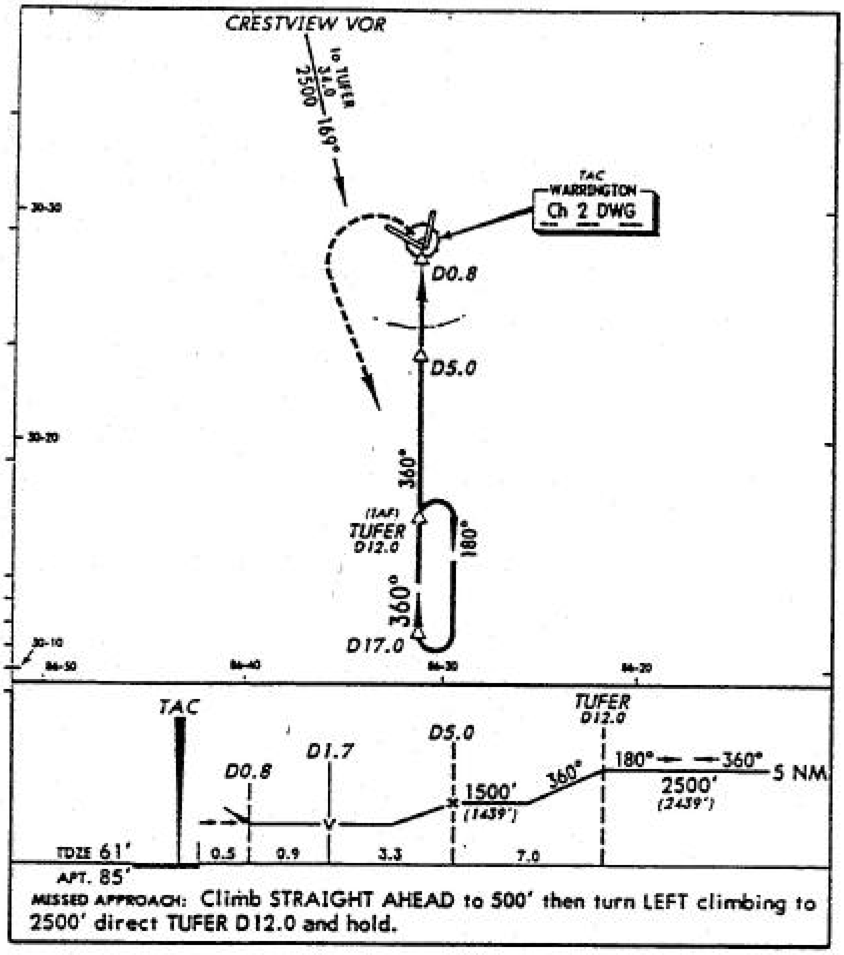

APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
T01	010	TUFER	IF	DWG	E_I	0120			02500	
T01	020	FF01	CF	DWG	E_F	0050	3600	0070	01500	
T01	030	RW01	CF	DWG	G__	0008	3600	0042	00111	-300
T01	040		VA		_M_		3600		00500	
T01	050	TUFER	DF		E__				02500	
T01	060	TUFER	HM	DWG	EE_H	0120	3600	001T	02500	

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NDB CODING EXAMPLE 1

Excerpted from Jeppesen Chart Majuro Intl, Marshall Island, NDB Rwy 25 Approach Chart by permission of Jeppesen Sanderson, Inc.

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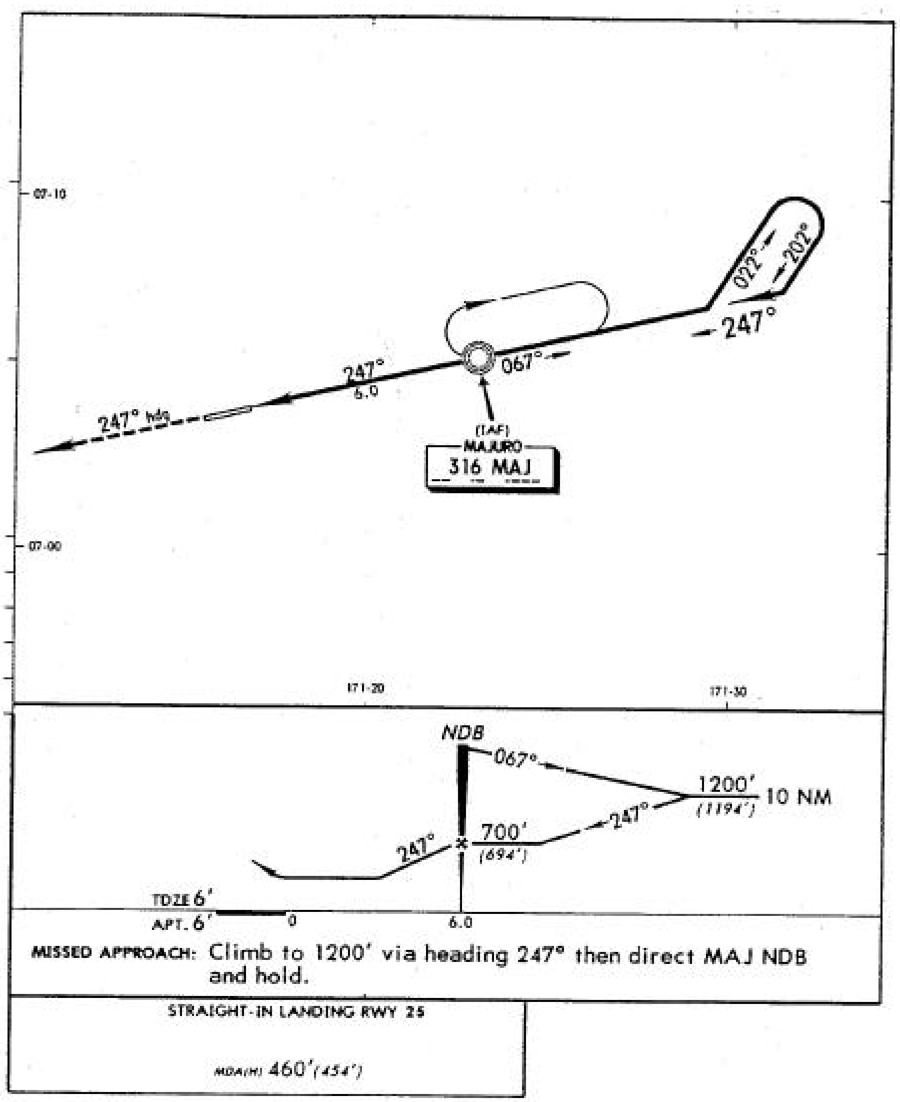


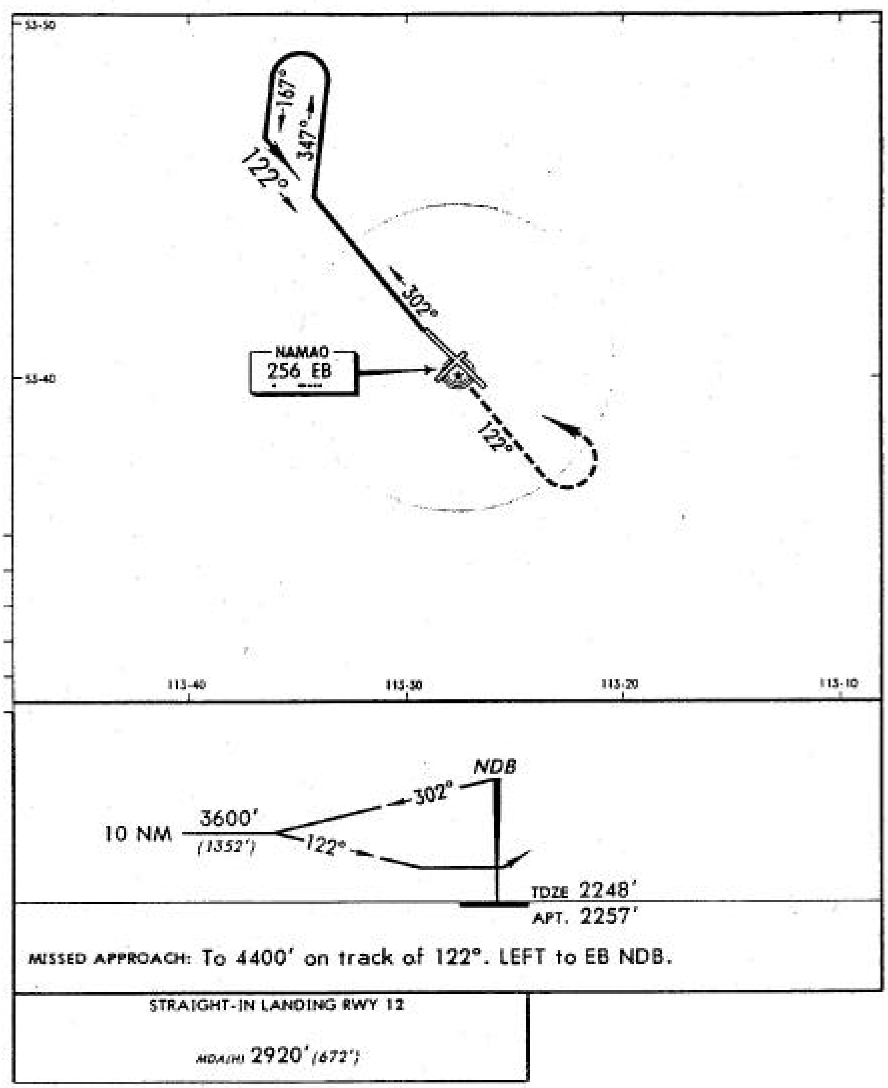
APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
N25	010	CF25	IF		E__I				01200	
N25	020	MAJ	CF	MAJ	E__F		2470	0035	00700	
N25	030	RW25	CF		G___		2470	0060	00056	-300
N25	040		CA				2470		01200	
N25	050	MAJ	DF		E___					
N25	060	MAJ	HM		EE_H		2470	001T		

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NDB CODING EXAMPLE 2

Excerpted from Jeppesen Chart Edmonton, Alberta, Canada, NDB Rwy 11 Approach Chart by permission of Jeppesen Sanderson, Inc.

Not for navigational or other operational use. For example only. Please consult current navigation. charts.



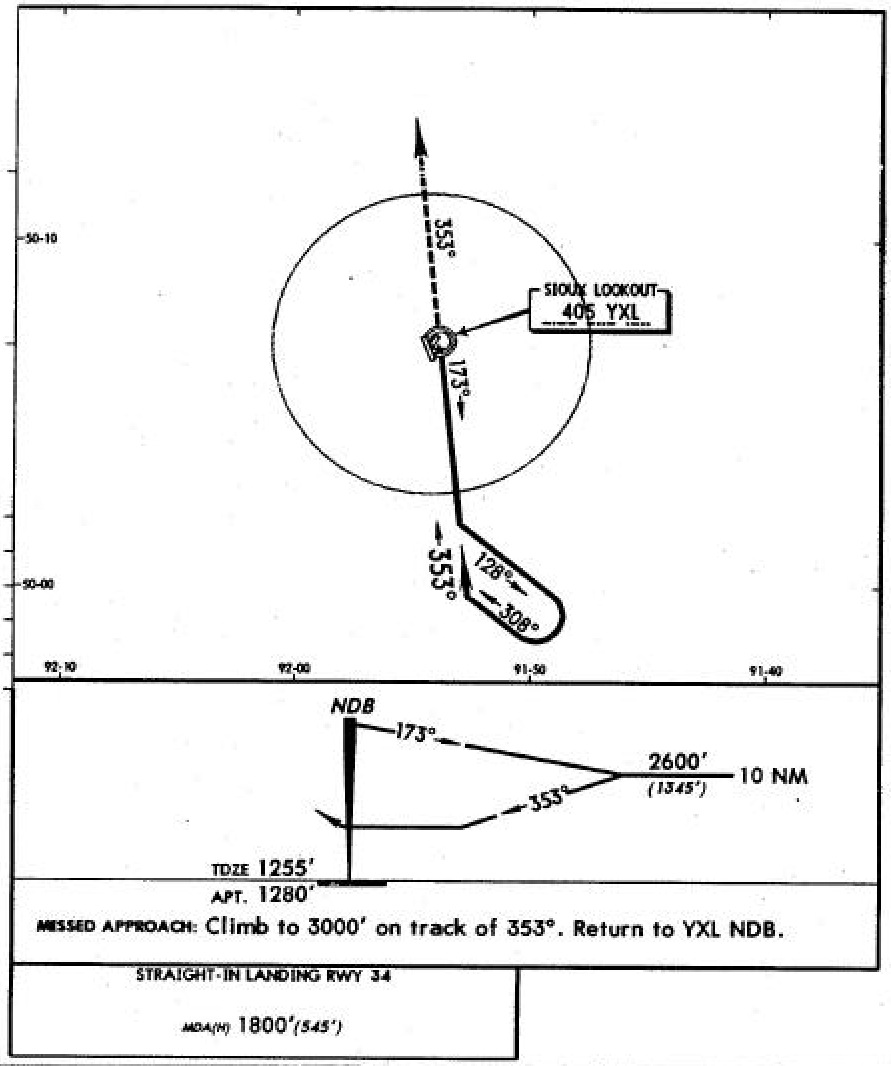
APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
N11	020	FF11	IF	EB	E_F				03600	
N11	030	RW11	CF		G___		1220	0055	02298	-300
N11	040	EB	CF	YEG	E_M_	0325	1220	0015	02657	
N11	050		CA				1220		04400	
N11	060	EB	DF	EB	EE__					

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NDB CODING EXAMPLE 3

Excerpted from Jeppesen Chart Sioux Lookout, Ontario, Canada, NDB Rwy 34 Approach Chart by permission of Jeppesen Sanderson, Inc.

Not for navigational or other operational use. For example only. Please consult current navigation. charts.



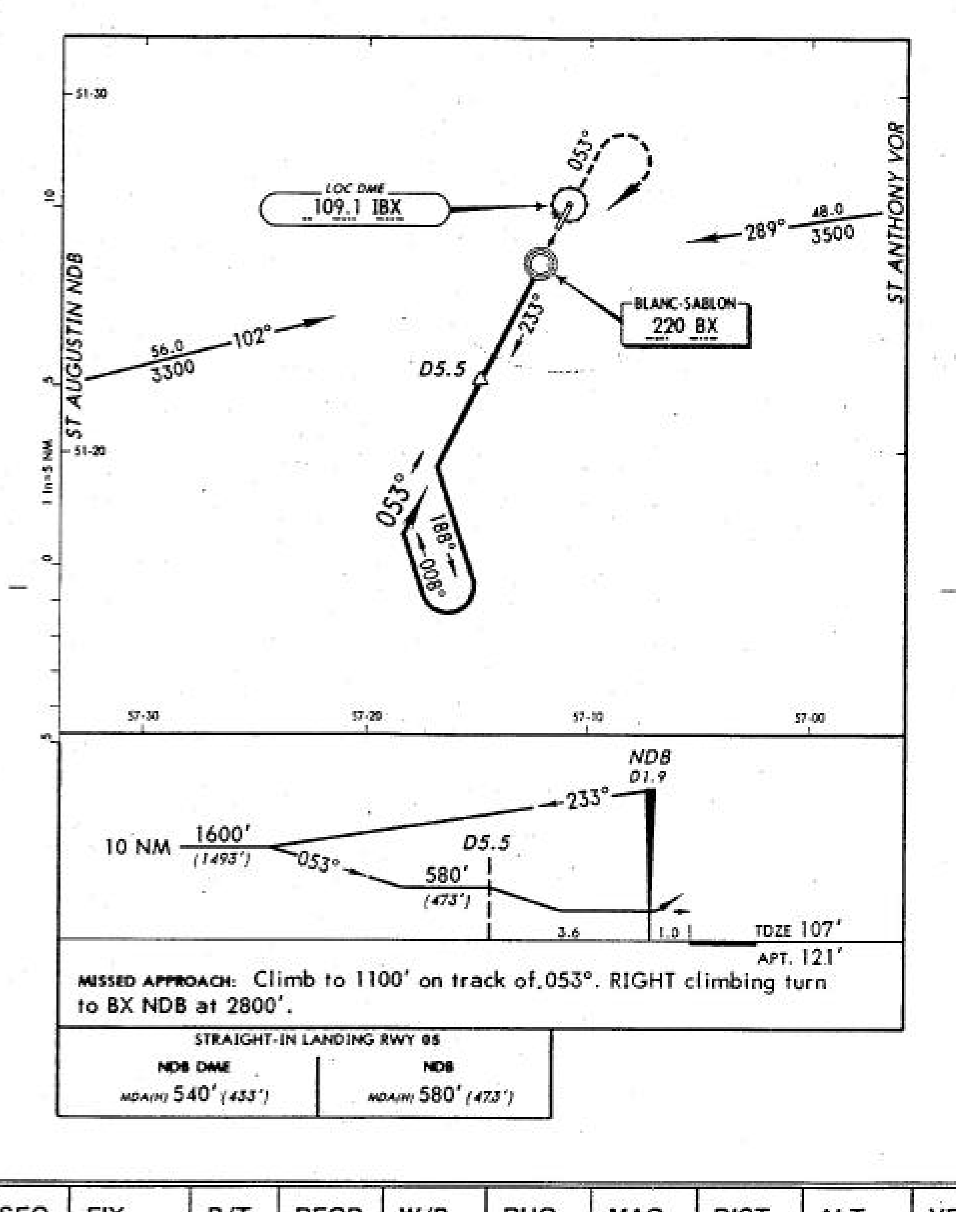
APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
N34	020	FF34	IF	YXL	E_F				02600	
N34	025	RC34	CF	YXL	R L		353	0045	01621	
N34	030	YXL	CF		E_M		3530	0015	01800	000
N34	040		CA		_M_		3530		03000	
N34	050	YXL	DF	YXL	EE_					

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NDB CODING EXAMPLE 4

Excerpted from Jeppesen Chart Blano-Sablon, Quebec, Canada, NDB Rwy 05 Approach Chart by permission of Jeppesen Sanderson, Inc.

Not for navigational or other operational use. For example only. Please consult current navigation. charts.



APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
N05	020	FF05	IF	BX	E_F				00580	
N05	030	BX	CF		E_M		0530	0036	00448	-300
N05	040		VA		_M_		0530		01100	
N05	050	BX	DF		EE__					

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

APPROACH AND APPROACH TRANSITION CODING RULES

7.0 Precision Approach Procedure Coding

7.1 Final Approach Segment

The following rules apply to the coding of "final approach segments" of Full ILS Localizer based approach procedures. These procedures may include FULL ILS (localizer and GS), Converging ILS, and those IGS (Instrument Guidance System) that are full ILS equivalent. These rules also apply to all type of MLS Approach Procedures and to GLS Approach Procedures.

7.1.1 All such approach procedures must begin at the FACF. They must consist of a FACF, FAF and missed approach point fix and all step-down fixes published in the vertical path.

c-14 7.1.2 For localizer based procedures, the FACF is defined as a fix located on the localizer beam center, 8NM or less from the FAF or within the reception range of the Localizer. This may be a source document provided fix or a fix created using these positioning rules.

7.1.3 The FACF is coded as an IF leg. An altitude will not be assigned to the FACF unless specified in government source documents.

7.1.4 The track from the FACF to the FAF is coded as a CF or TF leg with altitude constraints as indicated for the specific procedure types below.

7.1.5 The recommended navaid must be the procedure reference localizer. Theta and Rho must be provided from that navaid for each sequence of the final approach, including any step-down fixes, the runway or helipad fix and/or missed approach point.

7.1.6 The "Outbound Magnetic Course" field in all sequences must be equal to the localizer magnetic bearing or MLS course, derived from official government source.

7.1.7 For approach procedures with an electronic glide slope, the vertical angle must be coded in both the Final Approach Fix and the fix which carries the missed approach point coding. The FAF record carries the Final Approach Fix waypoint description code of "F" in position four of that field. The missed approach point fix carries the waypoint description code of "M" in this position four. The vertical angle will be the published glide slope angle for the installation or procedure.

7.1.8 The Coding of FAF and FACF Altitude description fields are as follows:

c-15

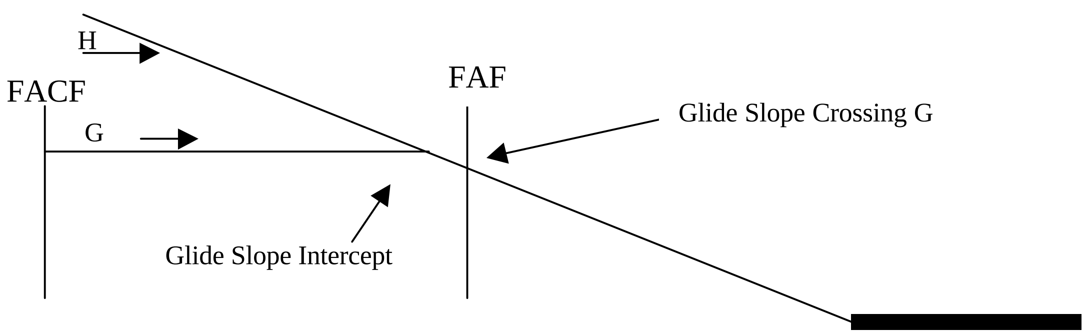


Table 2

	Altitude 1	**Altitude 2**	**Alt Desc** [2]
FAF	G/S Intercept Altitude is "at"	Glide Slope Crossing Altitude is "at"	G
	G/S Intercept Altitude is "at or above"	Glide Slope Crossing Altitude is "at"	H
FACF	State Defined Altitude is "at" [3]	Glide Slope Intercept Not Specified [1]	I
	State Defined Altitude is "at or above" [3]	Glide Slope Intercept Not Specified [1]	J

NOTES:

[1] "at" or "at or above" not specified
[2] reference Section 5.29
[3] may be blank

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

APPROACH AND APPROACH TRANSITION CODING RULES

7.3 GLS Precision Approach Procedure Coding

7.3.1 The rules for coding GLS Approach Procedures are understood to be identical to those of Localizer coding as found in Section 7.1 of this Attachment.

7.4 MLS Approach Procedure Coding.

MLS Approach Procedure Code utilizing raw azimuth and elevation data is limited to those procedures which are designed as a localizer equivalent. If such a procedures is coded, the rules for the "final approach segments" are to be identical with those stated in Section 7.1 above. The Route Type of such approaches must be coded as "M" in column 20 of the primary approach record. Approach procedures predicated on the use of MLS Area Navigation (MLS/RNAV) must be coded with a "W" or "Y" in column 20 of the primary approach record. MLS/RNAV approaches are coded as described below.

There are three types of MLS/RNAV approach, listed in increasing levels of complexity, computed lateral/raw vertical guidance, computed lateral and vertical guidance and curved path.

7.4.1 Approaches using computed lateral path and raw vertical path guidance, also referred to as Type "A," will be used primarily where the MLS azimuth transmitter cannot be located on the extended runway centerline, but the elevation transmitter is sited normally abeam the touchdown point. All legs will be straight and aligned with the inbound course. They must be codes with Route Type "W" in column 20 of the primary approach record. Path definition will be the equivalent of a full ILS approach (6.4.2) with the exception that the leg from the PFAF inbound will be a "TF" leg, terminating at the runway or helipad waypoint, with the published final approach source in the Outbound Magnetic Course field. The PFAF will be coded as the Final Approach Fix in the Waypoint Description field and the first fix prior to the PFAF will be coded as the Final Approach Course Fix.

7.4.2 Approach using computed lateral and vertical guidance but no curved legs, also referred to as Type "B," must be coded as Route Type "Y" in column 20 of the primary approach record. All legs will be straight and aligned with the inbound course. Path definition will be the equivalent of the full ILS approach (6.4.2) with the exception that the leg from the PFAF inbound will be a "TF" leg, with the published final approach course in the Outbound Magnetic Course field. The altitude of the PFAF and all waypoints inbound from it must be the glide path altitude at that point. The PFAF will be coded as the Final Approach Fix in Waypoint Description c-14
field and the first fix prior to the PFAF will be coded as the Final Approach Course Fix.

7.4.3 MLS/RNAV approaches using curved legs, also referred to as Type "C," will be used for a variety of reasons, including parallel sidestep approaches, separation of different categories of aircraft, noise abatement, etc. These must always be precision approaches. They must be coded a with a Route type of "Y" in column 20 of the primary approach record. The following rules apply:

7.4.3.1 The first leg of an MLS/RNAV approach with curved legs must be an "IF/TF" leg combination. All other straight legs must be coded as "TF" legs. All "TF" legs in an MLS/RNAV with curved legs procedure must have the published course included in the Outbound Magnetic Course field.

7.4.3.2 All curved legs must be coded as "RF" legs. Every leg preceding or following an "RF" leg must be tangent to the "RF" leg at that point and the overfly bit must be set for those waypoints.

7.4.3.3 The initial portion of a MLS/RNAV approach with curved legs may be an "IF/RF" combination, provided a straight leg approach transition is coded to the point in the "IF" and the rules in Section 7.3.2 are complied with.

7.4.3.4 The PFAF will be coded as the Final Approach Fix in the Waypoint Description field and the first fix prior to the PFAF will be coded as the Final Approach Course Fix. If there is not a fix at the glide path intercept, then the first fix after the intercept will be the PFAF. There must be one and only one PFAF for each MLS/RNAV approach with curved legs.

7.4.3.5 The last leg of an approach transition prior to an MLS/RNAV approach must be one of the following types CF, CI, HF, PI, RF or TF, except as indicated in Section 6.5.3.3. If the leg type is CF, CI, RF or TF, then the Recommended Navaid must contain the identifier of the MLS used for the approach. If the leg type is PI or HF, then the Recommended Navaid must contain the VHF Navaid that defines the PI or HF leg.

7.4.3.6 If the last leg prior to the approach is a "CI" leg, the intercept angle will be 30° or less, and the intercept point must be between the first and second terminator fixes in the approach, but no closer that 2NM to the second fix.

7.4.3.7 The PFAF and the FACF altitudes must be coded according to the rules outlined for Precision Approach Procedures in Section 6.4.2.

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

APPROACH AND APPROACH TRANSITION CODING RULES

c-14 7.4.4 The PFAF will be used in precision MLS/RNAV approaches. It is defined as that fix along the lateral path where the published barometric altitude intercepts the glide slope. Prior to the PFAF, the aircraft is expected to fly barometric altitude to intercept the glide path. All waypoints up to the PFAF should be coded using the published barometric crossing altitude. The PFAF and all waypoints after it should be coded using the true altitude of the glide path at those points.

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

8.0 Non-precision Approach Procedure Coding

8.1 General

8.1.1 For approach procedures without an electronic glide slope, the Final Approach Fix will be that designated by government source. If none is designated, one will be computed at an appropriate distance from the missed approach point, minimum distance is 4NM. If coded, this record must carry the Final Approach Fix Waypoint Description code of "F" in position four of that code field. The Altitude 1 field of this record must define the altitude of the vertical path at that point. Altitude 2 must be blank. Note that only one record in a coded approach procedure can carry the "F" in position four of the Waypoint Description.

8.1.2 A Vertical Angle must be coded in the Missed Approach Point, Runway Threshold or the Final End Point, which ever occurs first, for each approach procedure. Vertical Angles must be derived from official government source or computed. This vertical angle will be repeated on all step-down fixes after the FAF.

8.1.3 Missed Approach Point (MAP) Location - The MAP will be the MAP as shown on the non-precision approach procedure by the civil aviation authority. If the intent of the procedure designer is to locate the MAP at the LTP and it is within 0.1 NM radius of the landing threshold point, the MAP will be defined at the LTP.

Note: If the source document states that the MAP and the LTP are not at the same location even if the distance is 0.1 mile or less, the MAP will not be placed at the LTP.

8.2 Final Approach Path Coding - Localizer-based Procedures

The following rules apply to the coding of "final approach segments" of non-precision Localizer-based approach procedures. These procedures may include Localizer Only, IGS (Instrument Guidance System) LDA, Localizer type Directional Aid) and SDF (Simplified Directional Aid) procedures. c-14

8.2.1 All such approach procedures must begin at the FACF. They must consist of a FACF, FAF and missed approach point fix and all step-down fixes published in the vertical path.

8.2.2 The FACF is defined as a fix located on the localizer beam center, 8NM or less from the FAF or within the reception range of the Localizer. This may be a source document provided fix or a fix created using these positioning rules.

8.2.3 The FACF is coded as an IF leg with an altitude only when assigned by government source.

8.2.4 The track from the FACF to the FAF is coded as a CF or TF leg with altitude constraints as indicated for the specific procedure types below.

8.2.5 The recommended navaid must be the procedure reference localizer. Theta and Rho must be provided from the localizer for each sequence of the final approach, including any step-down fixes, the runway or helipad fix and/or missed approach point.

8.2.6 The "Outbound Magnetic Course" field in all sequences must be equal to the localizer magnetic bearing, , derived from official government source.

8.3 Final Approach Path Coding - VOR-based Procedures

The following rules apply to the coding of the "final approach segments" of non-precision VOR-based approach procedures. These procedures may include VOR, VORDME, VORTAC, RNAV and TACAN procedures.

8.3.1 Final approach segments must be coded using IF and CF or TF[1] legs only.

8.3.2 Final approach must include either a FAF and missed approach fix which may be a runway fix or helipad fix. Coding of a FACF is defined in subsequent paragraphs.

---

[1] In general "CF" legs are used in final approach coding. "TF" legs are used in FMS and GPS Approach Procedures, some types of MLS Procedures and in other procedure types where the determination has been made that a TF will work better than a CF.

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

APPROACH AND APPROACH TRANSITION CODING RULES

8.3.3 The recommended navaid must be the procedure reference VOR or TACAN. Theta values must be provided from that facility in all final approach sequences, including any step-down fixes that are included.

8.3.4 When the reference facility is VORDME or VORTAC or TACAN, the following applies:

8.3.4.1 Final approach segments must be coded using IF and CF or TF[1] legs only.

8.3.4.2 Final approach must include FACF, FAF and a missed approach point which may be a missed approach point fix, a runway fix or a helipad fix, and all step-down fixes published in the vertical path.

8.3.4.3 The recommended navaid must be the procedure reference VORDME or VORTAC or TACAN. Theta and Rho values must be provided from that facility in all final approach sequences, including any step-down fixes that are included.

8.3.5 When the procedure reference is RNAV, the following applies:

8.3.5.1 Final approach segments must be coded using IF and CF or TF[1] legs only.

8.3.5.2 All RNAV approach procedure missed approach points must be at or prior to a runway threshold or helipad alighting point. These points may be a source defined named waypoint.

8.3.5.3 The recommended navaid must be the procedure reference VORDME or VORTAC. Theta and Rho values must be provided from that facility in all final approach sequences, including any step-down fixes that are included.

8.3.6 When the reference facility is a TACAN, the following applies in addition to 8.3.4 above.

8.3.6.1 TACAN approach procedures must only be coded into a data base when:

c-14 8.3.6.2 No other VHF navaid based approach procedure that can be coded has been published by official source for the runway or helipad in question.

8.3.6.3 The runway or helipad in question and the associated airport can be supported as defined in this specification.

8.4 Final Approach path Coding - NDB-based Procedures

The following rules apply to the coding of the "final approach segment" of all NDB based approach procedures. NDB based approach procedures include procedures using a NDB or Locator as the reference facility and procedures using a NDB or Locator and a DME (NDB + DME) as reference facilities. NDB approach procedures not requiring DME but using the DME for reduced minimums will be coded as NDB + DME procedures.

8.4.1 NDB approach procedures must include a FAF and a runway or helipad fix or missed approach point fix and all step-down fixes published in the vertical path. They may also include a FACF fix.

8.4.2 If no waypoint is established by source for the FAF, one will be established on the final approach course using the initial approach altitude, the computed vertical descent angle and a distance to the runway threshold or helipad alighting point or missed approach point of not less than 4NM. If a Final End Point exists, the FAF will be established not less than 4NM from the FEP.

8.4.3 NDB + DME approach procedures must include a FACF, FAF and runway or helipad fix or missed approach point fix and all step-down fixes published in the vertical path.

8.4.4 Coding must use IF and CF or TF[1] legs only through to the runway or helipad fix or missed approach point fix. The IF leg must be at the FAF (or at the optional FACF) for NDB procedures or at the FACF for NDB + DME procedures.

8.5 Intentionally Left Blank

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[1] In general "CF" legs are used in final approach coding. "TF" legs are used in FMS and GPS Approach Procedures, some types of MLS Procedures and in other procedure types where the determination has been made that a TF will work better than a CF.

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

APPROACH AND APPROACH TRANSITION CODING RULES

8.6 Final Approach Path Coding - Circle-To-Land Procedures

Approach Procedures with Circle-To-Land weather minimums may be included in the database. When they are included, they are identified with the route type appropriate to the sensor involved and the "Circle-To-Land" Approach Procedure Route Qualifier of "C." These rules applies to approach routes so identified:

8.6.1 The last segment in the final approach sequence must be the missed approach point fix.

8.6.2 For Circle-To-Land Procedures that are to a runway or helipad, all the rules listed above in Sections 6, 7 and 8 apply, as well as the rules for Missed Approach Procedure coding in Section 9.

8.6.3 For Circle-To-Land Procedures that are not to a runway or helipad, the missed Approach Point will be the center of the airport or heliport.

8.6.4 The vertical angle information must be in the missed approach point fix segment and must be in accordance with the rules in Section 6, 7 and 8 of this Attachment for the type of reference facility on which the procedure is based.

8.7 Final Approach Path Coding - GNSS-based Procedure

The rules for final approach path GNSS-based procedures are currently under development.

8.7.1 The track from the FACF to the FAF is coded with TF or RF legs. The RF leg is not allowed as the first leg of the approach coding according to the Beginning/Ending Leg Table. The preferred coding when an approach starts with a precision arc is the use of an "IF" leg at the FACF, followed by "RF" to the FAF. According to the rules on "RF" legs, this must require that a straight line, fix terminated, approach transition to the FACF has been included. The track in the transition must be tangent to the arc and the fix at the end of the transition must be overflown. The rule also does not exclude the use of an RF leg in between FAF and the final TF leg to the missed approach point. Such RF legs must be coded with the 4th character of the Waypoint Description field blank. c-14

8.8 Final Approach Path Coding - Helicopter Approach Procedures

Helicopter Approach Procedures will be coding using the rules in Sections 6, 7 and 8 and 9 of this Attachment, appropriate to the type of sensor required for the procedure, such as VORDME or ILS or RNAV or GNSS. This includes rules for Recommended Navaid, FACF requirements, beginning and ending leg types, etc.

The Lateral Path Rules for the sensor related procedure coding reference a "missed approach point fix," a "runway fix" or a "helipad fix" as the missed approach point. Those same rules apply to the coding of helicopter procedure.

8.9 Vertical Navigation Path (VNAV Path) or Descent Gradient Considerations

If the government source provides a vertical angle and/or TCH, it will be used. The only exception is when the source provides more than one angle for the final approach segment. If more than one angle is provided for the final approach segment, the highest angle will be used.

The following guidelines have been developed for the coding of the vertical angles on the final approach course when the vertical angle is not provided by the government sources.

8.9.1

The descent angle is to be calculated from published TCH or a point 50 feet above the Landing Threshold Point (LTP) to the altitude at the final approach fix (FAF). The curvature of the earth should not be used in the calculations of the descent angle. Refer to examples 1, 7, and 8. The descent angle will always be rounded up to the nearest one hundredth of a degree.

Examples of Rounding:

3.111 = 3.12
3.346 = 3.35

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

APPROACH AND APPROACH TRANSITION CODING RULES

8.9.2 If the calculated angle is less than three degrees, it will be raised to a minimum of three degrees.

8.9.3 If a step-down fix is included in the final approach segment and it is determined that the calculated descent angle will be above the step-down fix altitude, that calculated descent angle will be used. If it is determined that the step-down fix altitude is above the descent path, the descent angle will be calculated from the LTP plus 50 feet to the altitude at the step-down fix. Refer to Examples 3 and 4.

8.9.4 The descent angle should not be less than the Visual Glide Slope Indicator (VGSI) associated with the landing runway. If the calculated descent angle is less than the VGSI, the descent angle should be raised to match the VGSI or to 3.77 degrees whichever is lower.

c-14

8.9.5 If the final approach course does not pass over the runway threshold, a position abeam the runway threshold on the final approach course will be calculated and coded as a Final End Point. The descent angle will be computed from the abeam position to the altitude at the FAF. The altitude to be used at the Final End Point is the LTP plus 50 feet. Refer to Examples 6, 9, and 10.

8.9.6 If the missed approach point is prior to the runway threshold, the descent angle will be computed from the LTP plus 50 feet to the altitude at the FAF. An altitude will be specified at the MAP and will be the altitude where the descent angle passes through the MAP. Refer to Examples 7 and 8.

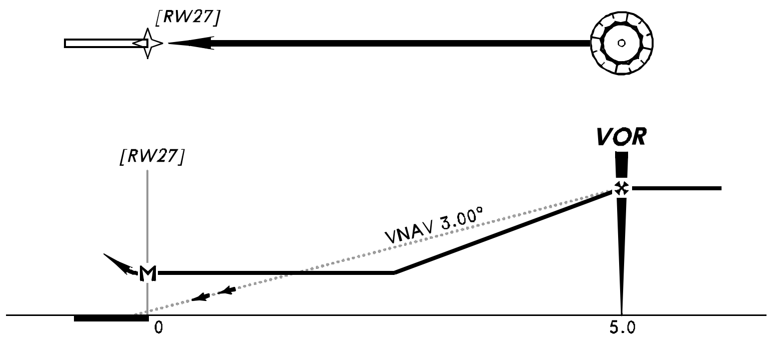
8.9.7 When circling-to-land minimums are the only landing minimums and the runway is in alignment with the final approach segment, a descent angle will be provided. The descent angle will be calculated from the LTP plus 50 feet to the altitude at the FAF. Refer to Example 11 and 12.

8.9.8 When circling-to-land minimums are the only landing minimums and the runway is not in alignment with the final approach segment, a descent angle will be provided. The descent angle will be calculated from a point on the final approach track Abeam the LTP of the nearest landing runway to the altitude at the FAF. The altitude to be used at the abeam position is the airport elevation. Refer to Example 13.

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NON-PRECISION APPROACH CODING EXAMPLE 1

This example shows a Final Approach Fix (FAF) to Missed Approach Point (MAP) at Landing Threshold Point (LTP) final approach path with Straight-In landing alignment. The VNAV angle, when not provided in official government source, is calculated from LTP + 50 feet to the FAF altitude and coded in the MAP sequence. c-14

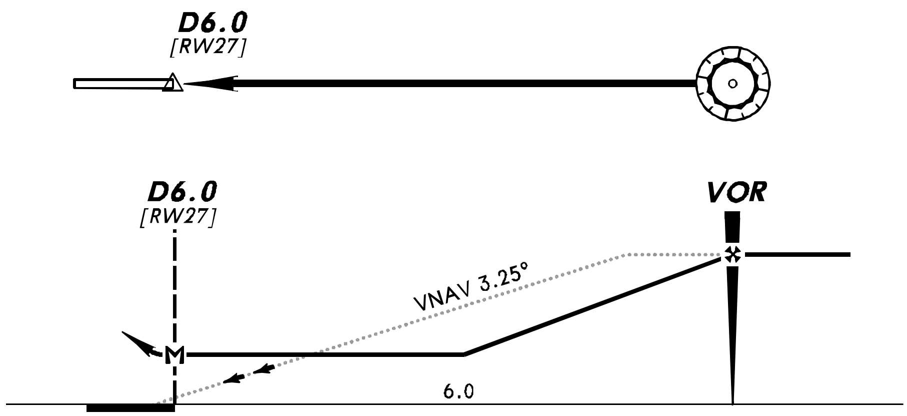


ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NON-PRECISION APPROACH CODING EXAMPLE 2

c-14

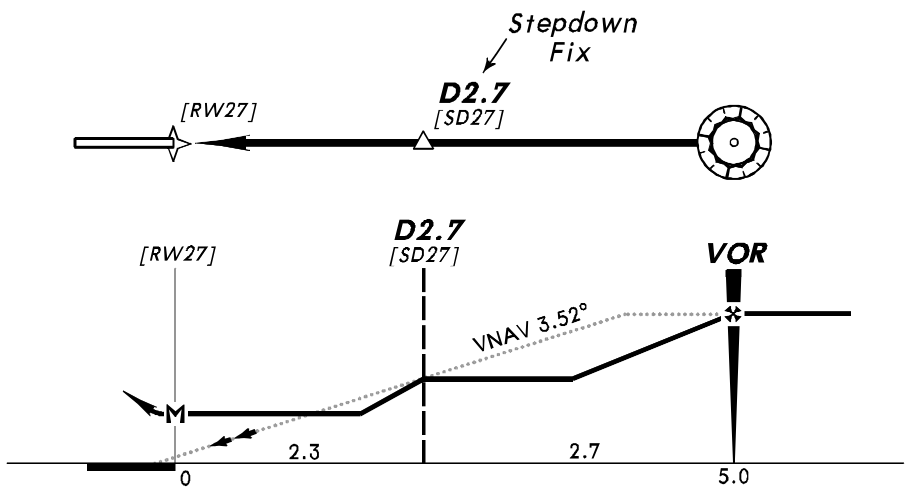
This example shows a Final Approach Fix (FAF) to Missed Approach Point (MAP) at Landing Threshold Point (LTP) final approach path with Straight-In landing alignment. The VNAV angle is calculated from LTP + 50 feet to the FAF altitude, and raised to an optimum angle of 3.00 degrees or to an angle matching the VASI/PAPI angle. This adjusted angle is coded in the MAP sequence



ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NON-PRECISION APPROACH CODING EXAMPLE 3

This example shows Final Approach Fix (FAF) to Missed Approach Point (MAP) at Landing Threshold Point (LTP) via Step-down Fix final approach path with Straight-In landing alignment. The VNAV angle is calculated from LTP + 50 feet to the FAF altitude and coded in the MAP sequence. If the Step-down penetrates VNAV path of LTP + 50 feet to FAF altitude, as shown in this example, the VNAV angle is raised to clear step-down and this revised VNAV angle is used for entire final approach. c-14

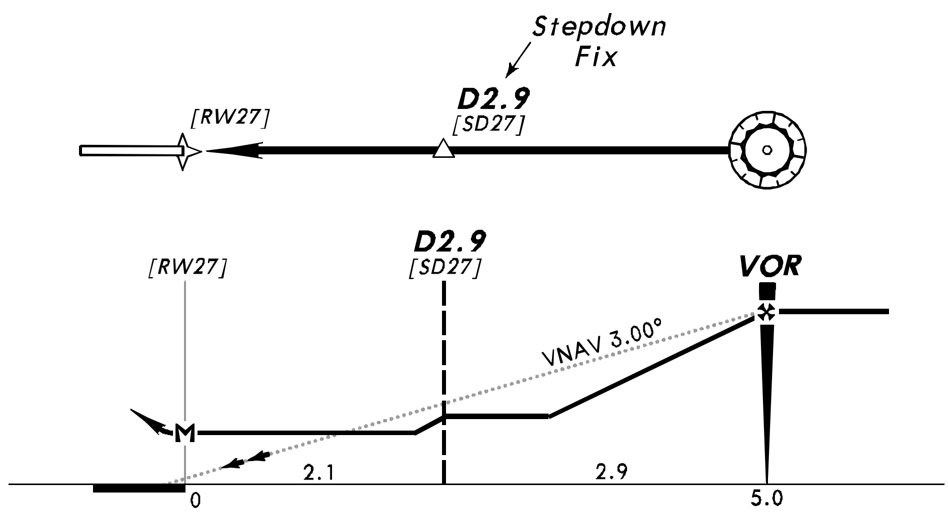


ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NON-PRECISION APPROACH CODING EXAMPLE 4

This example shows a Final Approach Fix (FAF) to Missed Approach Point (MAP) at Landing Threshold Point (LTP) via Step-down Fix final approach path with Straight-In landing alignment. The VNAV angle is calculated from LTP + 50 feet to the FAF altitude and coded in the MAP sequence. When the Step-down does not penetrate VNAV path of LTP + 50 feet to FAF altitude, there is no requirement to raise angle.

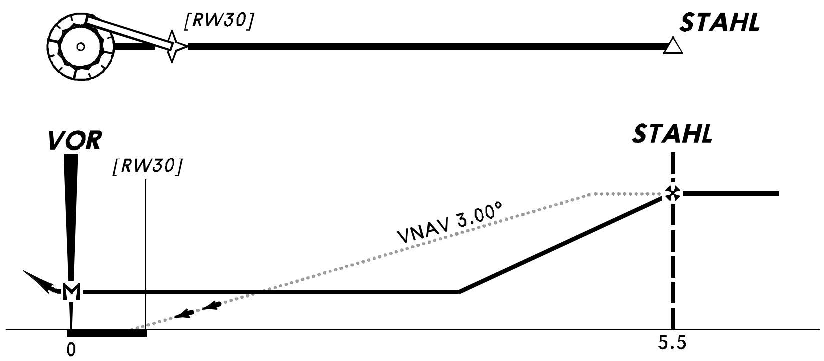
c-14



ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NON-PRECISION APPROACH CODING EXAMPLE 5

This example shows a Final Approach Fix (FAF) to Missed Approach Point (MAP) beyond Landing Threshold Point (LTP) final approach path with Straight-In landing alignment. The MAP position is the officially published government source position and is beyond the LTP. A "LTP Fix" waypoint (runway) is required in the correct coding of this example. The VNAV angle is calculated from LTP + 50 feet, not the MAP, to the FAF altitude, and coded in the LTP sequence. c-14

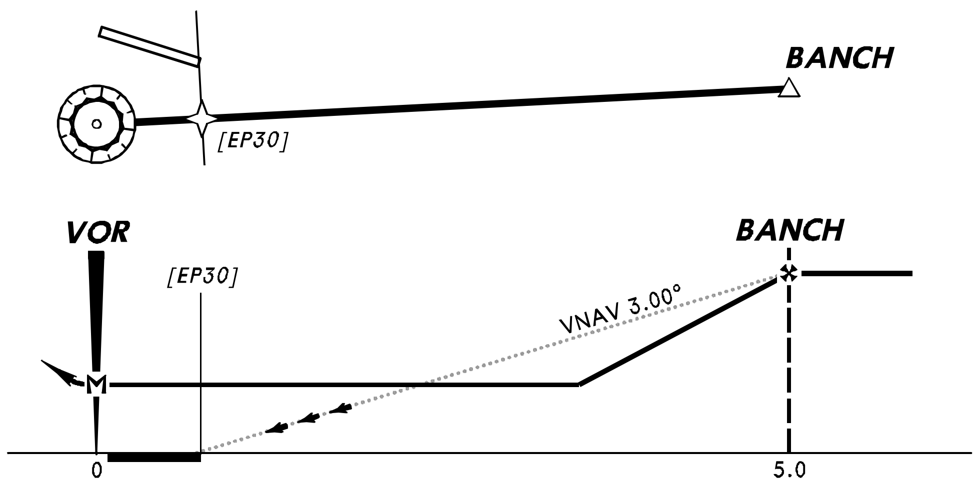


ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NON-PRECISION APPROACH CODING EXAMPLE 6

This example shows a Final Approach Fix (FAF) to Missed Approach Point (MAP) beyond Landing Threshold Point (LTP) final approach path. The MAP is located more than 0.1NM from LTP. The MAP position is the officially published government source position. A Final End Point (FEP) " LTP" waypoint required. The procedure does meet Straight-in landing alignment criteria. The VNAV angle is calculated from a LTP + 50 feet elevation to the FAF altitude, using the Final End Point waypoint position and coded in the FEP sequence.

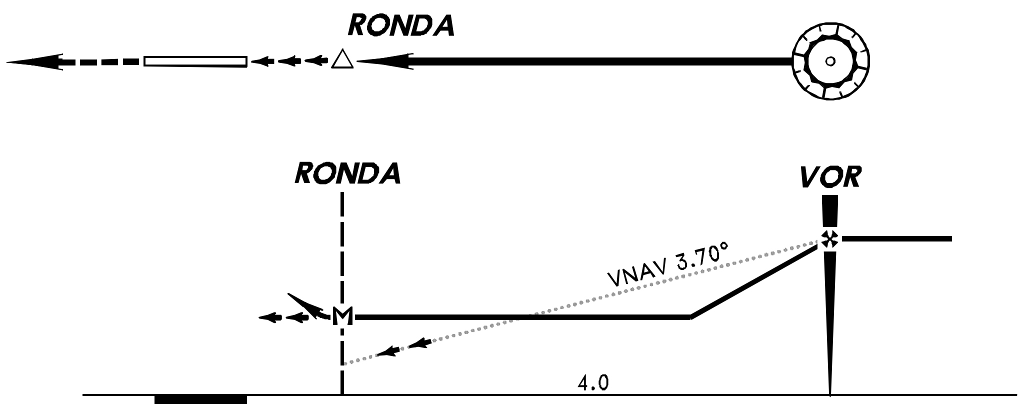
c-14



ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NON-PRECISION APPROACH CODING EXAMPLE 7

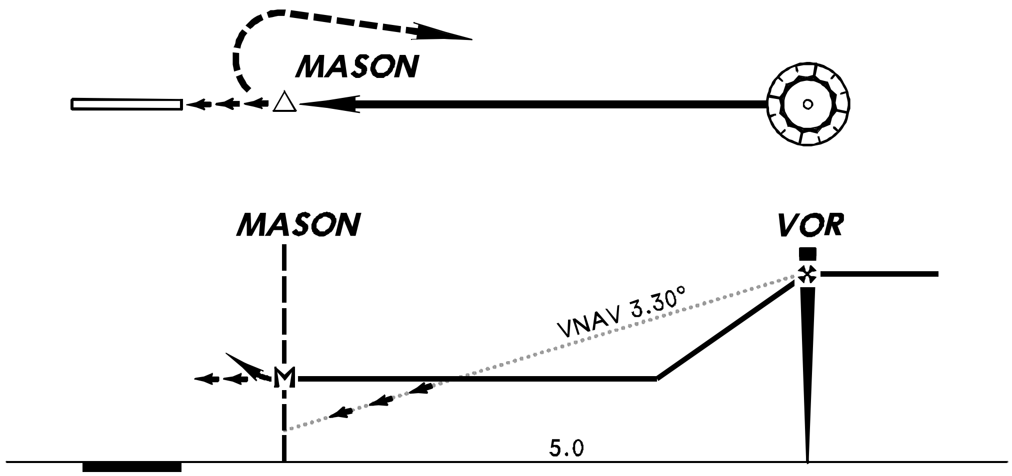
This example shows a Final Approach Fix (FAF) to Missed Approach Point (MAP) before Landing Threshold (LTP) final approach path with Straight-in landing alignment. The MAP position is the officially published government source position. The VNAV angle is calculated from the LTP +50 feet to the FAF altitude, and coded in the MAP sequence. The Altitude in the MAP sequence is assigned based on computation, using the calculated VNAV angle. The LTP is not included in the coding as a waypoint. The Missed Approach Procedure is coded as straight ahead over runway. c-14



ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NON-PRECISION APPROACH CODING EXAMPLE 8

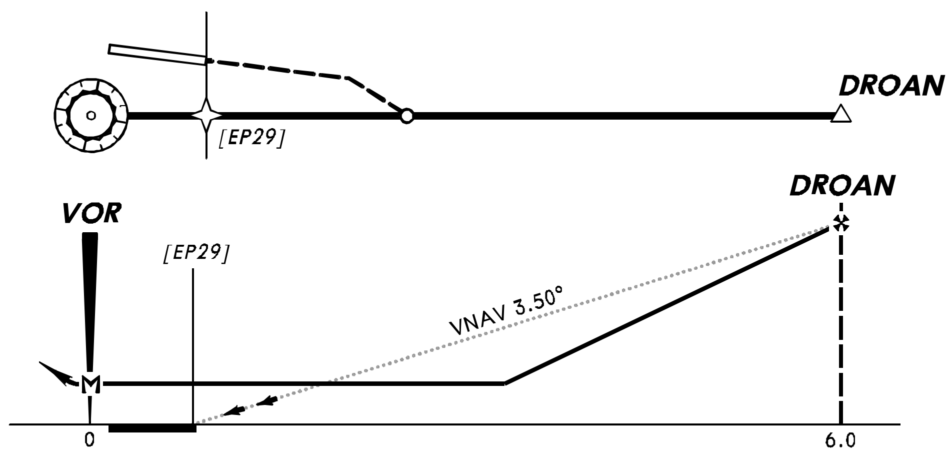
c-14 This example shows a Final Approach Fix (FAF) to Missed Approach Point (MAP) final approach path meeting Straight-in landing alignment criteria with the MAP before Landing Threshold Point (LTP). The MAP position is the officially published government source position. The VNAV angle is calculated from the LTP +50 feet to the FAF altitude, and coded in the MAP sequence. The Altitude in the MAP is assigned based on computation, using the calculated VNAV angle. The LTP is not included in the coding as a waypoint. The Missed Approach Procedure includes immediate turn at the MAP.



ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NON-PRECISION APPROACH CODING EXAMPLE 9

This example shows a Final Approach Fix (FAF) to Missed Approach Point (MAP) final approach path with the MAP beyond Landing Threshold Point (LTP), and located more than 0.1NM from the LTP. The MAP position is the officially published government source position. A "Final End Point" (FEP) waypoint is required. The procedure meets Straight-in landing alignment criteria. The VNAV angle is calculated from a LTP+50 feet elevation to the FAF altitude, using the FEP fix position and coded in the FEP sequence.



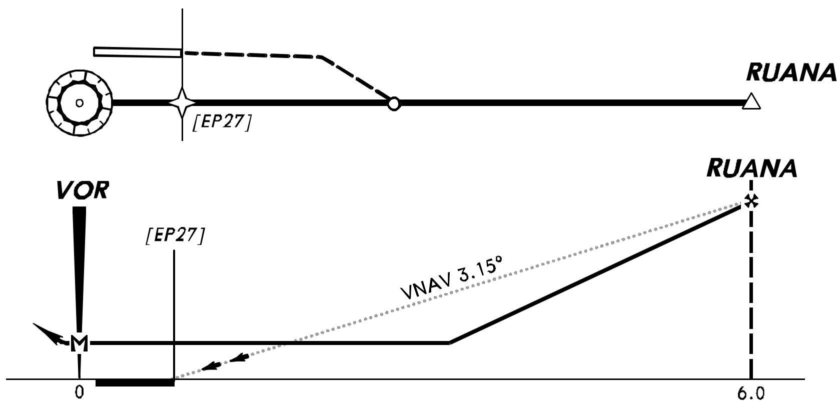
c-14

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NON-PRECISION APPROACH CODING EXAMPLE 10

This example shows a Final Approach Fix (FAF) to Missed Approach Point (MAP) final approach path with the MAP located beyond Landing Threshold Point (LTP). The Final Approach segment is parallel/near parallel to the runway alignment. The MAP is located more than 0.1NM from LTP. The MAP position is the officially published government source position. A "Final End Point (FEP)" waypoint is required. The VNAV angle is calculated from a LTP +50 feet elevation to the FAF altitude, using the Final End Point position and coded in the FEP sequence.

c-14

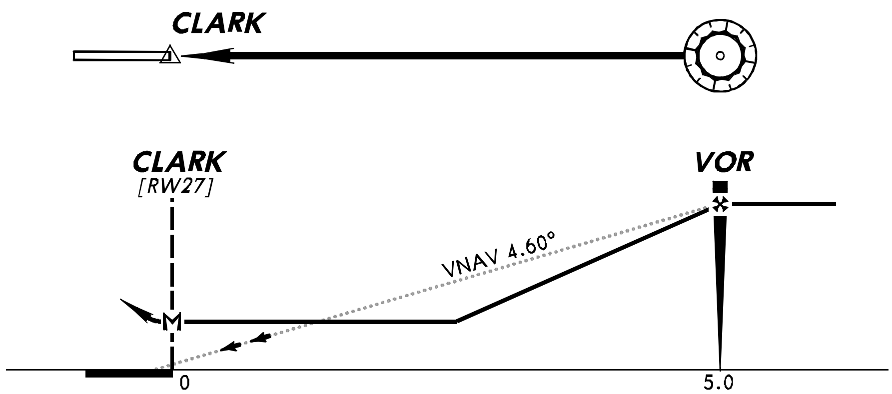


ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NON-PRECISION APPROACH CODING EXAMPLE 11

This example shows a Final Approach Fix (FAF) to Missed Approach Point (MAP) at Landing Threshold Point (LTP) final approach path. The procedure is published with Circle-To-Land weather minimums although the straight-in landing alignment criteria are met. The MAP position is the officially published government source position. The MAP is a published waypoint at the LTP. The VNAV angle is calculated from the LTP +50 feet to the FAF altitude, and coded in the MAP sequence.

c-14



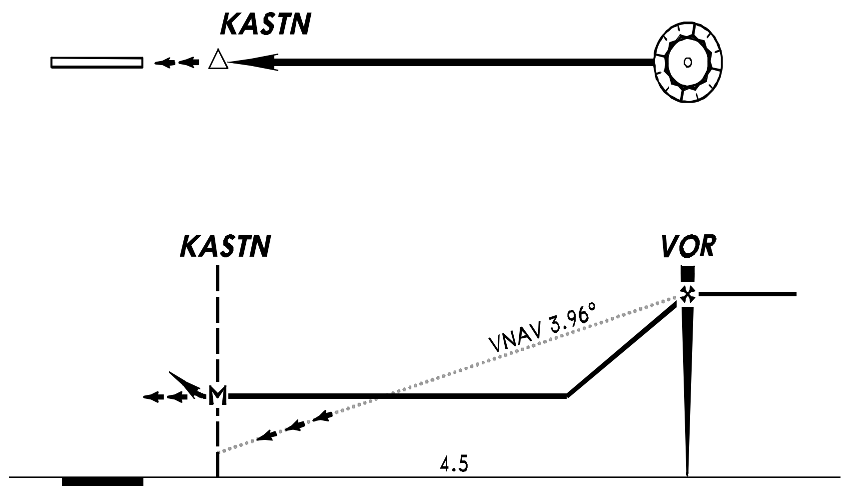
ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NON-PRECISION APPROACH CODING EXAMPLE 12

This example shows a Final Approach Fix (FAF) to Missed Approach Point (MAP) final approach path where the MAP is before the Landing Threshold Point (LTP).

The procedure is Circle-To-Land weather minimums although Straight-in landing alignment criteria are met. The MAP position is the officially published government source position. The LTP is not included in the coding. The VNAV angle is calculated from the LTP +50 feet to the FAF altitude and coded in the MAP sequence.

c-14

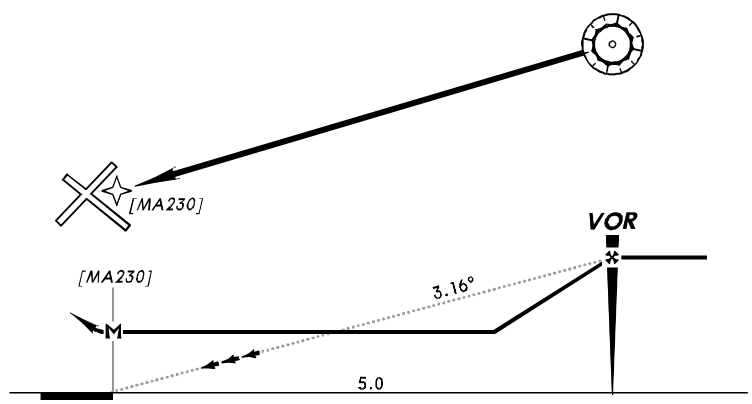


ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

NON-PRECISION APPROACH CODING EXAMPLE 13

This example shows a Final Approach Fix (FAF) to Missed Approach Point (MAP) that is other than the Landing Threshold Point (LTP), and is not before, beyond or abeam the Landing Threshold Point. The procedure is published with Circle-To-Land weather minimums. Straight-in landing alignment criteria are not met.

The MAP position is the officially government source position or, if not published, established as a point abeam the nearest landing threshold. The VNAV angle is calculated from the airport elevation to the FAF altitude and coded in the MAP sequence. c-14



ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

APPROACH AND APPROACH TRANSITION CODING RULES

9.0 MISSED APPROACH PROCEDURE RULES VALID FOR ALL PROCEDURE TYPES

c-14

Missed Approach Procedure coding must be accomplished as an integral part of the Approach Procedure Coding and will be provided for each approach procedure contained in the data base. Specific coding must be incorporated to facilitate identification of where the Missed Approach Coding starts within any given approach procedure.

c-15

The structure of the procedure records included in this Specification as defined in this Attachment is such that multiple missed approach procedure paths may be coded for a single approach procedure. This will accommodate those procedures with alternative missed approach paths based on aircraft climb performance. Coding for multiple missed approach paths for a single approach procedure must commence at the same missed approach point. Identification of multiple missed approach procedures, when coded, will be accomplished through the coding of a specific Transition Identifier which closely aligns with published information.

9.1 Missed Approach Point

9.1.1 All Approach Procedure coding must have a segment that identifies the Missed Approach Point Fix. Such a fix must be the published Missed Approach Point, either a IFR Landing Threshold or a Helipad Alighting Point or a dedicated Missed Approach Point (MAP Fix).

9.1.2 Identification of the fix within a sequence of procedure records and the type of fix, must be accomplished through code in the "Waypoint Description" field (see Section 5.17)

9.1.2.1 When the Missed Approach Point Fix is a Runway or Helipad Fix, Waypoint Description Position One, must carry a character "G" and the "M" in Position Four.

9.1.2.2 When the Missed Approach Point Fix is MAP Fix, Waypoint Description Position One will carry a code equal to the type of fix such a Navaid or waypoint and must carry a character "M" in Position Four.

9.2 First Leg of Missed Approach Procedure

9.2.1 The first sequence of the Missed Approach Procedure must always be coded with the character "M" in Position Three of the "Waypoint Description" field.

c-14

9.2.2 Coding of the Missed Approach Procedure assumes that the procedure will be flown commencing at the Missed Approach Point Fix.

9.3 Vertical Path of Missed Approach Procedure

9.3.1 If the published Missed Approach Point Fix is a Runway fix or a Helipad Fix, then the following rules apply:

9.3.1.1 The Altitude 1 value in the Missed Approach Point sequence must be equal to Runway Threshold or Helipad Alighting Point Elevation plus the published TCH. If TCH is not specified by source then use 50 feet.

9.3.1.2 The first leg of a Missed Approach Procedure must contain an altitude indicating a command to climb. This must be an "AT OR ABOVE" altitude terminating at least 400 feet above the airport elevation or as specified by source.

9.3.1.3 In precision approach procedures or "Full ILS" (Localizer and Glide Slope) or GLS, the Altitude 1 value in the Missed Approach Point Fix sequence must be equal to runway threshold or the helipad alighting point elevation plus the published TCH. If TCH is not specified by source then use 50 feet. The "Decision Height" value at which the Missed Approach Procedure would normally be commenced is not coded as part of the Approach Procedure. The Altitude 1 value in the first leg of the Missed Approach Procedure must still be equal to airport elevation plus 400 feet and must indicate a command to climb from the "Decision Height" but not necessarily from the altitude in the Missed Approach Point Fix sequence.

c-15

9.3.1.4 In non-precision approach procedure coding, the Altitude 1 value in the Missed Approach Point Fix sequence must be equal to the runway threshold or helipad aligning point elevation plus the published TCH or 50 feet. The "Minimum Descent Altitude" value at which the missed approach decision would normally be made is not coded as part of the Approach Procedure. The Altitude 1 value is the first leg of the Missed Approach Procedure must still be equal to the airport elevation plus 400 feet and must indicate a command to climb from the Minimum Descent Altitude but nor necessarily from the altitude in the Missed Approach Point Fix sequence.

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

APPROACH AND APPROACH TRANSITION CODING RULES

9.3.1.5 Unless an immediate turn is specified in an ILS or GLS missed approach, if the source describes a turn greater than 15 degrees from the final approach path, without an altitude specified before the turn, as the first leg of a missed approach, a course from or heading to an altitude (CA, FA, VA) leg must be coded as the first leg of the missed approach and must include a command to climb before the turning leg, using the approach heading for the leg heading or course. This leg will terminate at least 400 feet above the airport elevation, unless a higher altitude is specified. c-15

9.4. If the published Missed Approach Point Fix is a fix other than the runway threshold or helipad alighting point, the following rules apply:

9.4.1 If the Altitude 1 value in the Missed Approach Point (MAP) sequence is a data base supplier calculated value, the Altitude 1 value in the first leg of the Missed Approach Procedure must be:

9.4.1.1 Equal to airport elevation plus 400 feet if that value is higher than the calculated MAP Fix value.

9.4.1.2 Equal to the Altitude 1 value in the MAP Fix sequence if that value is higher than the value expressed as airport elevation plus 400 feet.

9.4.1.3 Equal to the Altitude 1 value in the second leg of the Missed Approach Procedure if that value is lower than the values derived in either a or b above.

9.4.1.4 Unless an immediate turn is specified in an ILS or GLS missed approach, the first leg of the missed approach procedure must either be a continuance of the final approach path track, within plus/minus 15 degrees or direct entry to a holding at the missed approach point. If the published missed approach procedure requires a deviation of more than 15 degrees, a course from or a heading to an altitude leg (CA, FA, VA) must be coded as the first leg. The leg must be coded using the approach procedure heading. The altitude termination must be at or above the highest possible altitude determined by following rules 1, 2, and 3 above. c-14

9.4.1.5 If the source describes a direct entry into a holding pattern at the missed approach fix as the first leg of the missed approach procedure, the missed approach will be coded using a "HA" or "HM" leg.

The coding for the "HA" or "HM" will also include a government source provided altitude.

9.5 Other Missed Approach Procedure Considerations.

9.5.1 Opposite end runway or helipad fixes must not be used in the coding of missed approach procedures.

9.5.2 Unless a VHF Navaid (VORDME/VORTAC) is available within 40NM, or the procedure is an NDB-based procedure, Missed Approach Procedure coding must be accomplished using leg types which do not require a Recommended Navaid, with the following exceptions:

9.5.2.1 The first leg of a Missed Approach Procedure may be a CD, FD or VD leg. For these legs a DME may be used as the Recommended Navaid, with the Theta field left blank and the DME distance entered in the Rho field.

9.5.2.2 On TACAN Approach Procedures, Missed Approach Procedures may use the TACAN as the Recommended Navaid in place of the VORDME or VORTAC.

9.5.2.3 The first leg of the Missed Approach Procedure may be a CR or a VR leg. For these legs, a VOR facility (without or without DME) may be used as the Recommended Navaid. When the facility has no DME, the Rho field is left blank and the VOR radial is entered in the Theta field.

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

MISSED APPROACH CODING EXAMPLE 1

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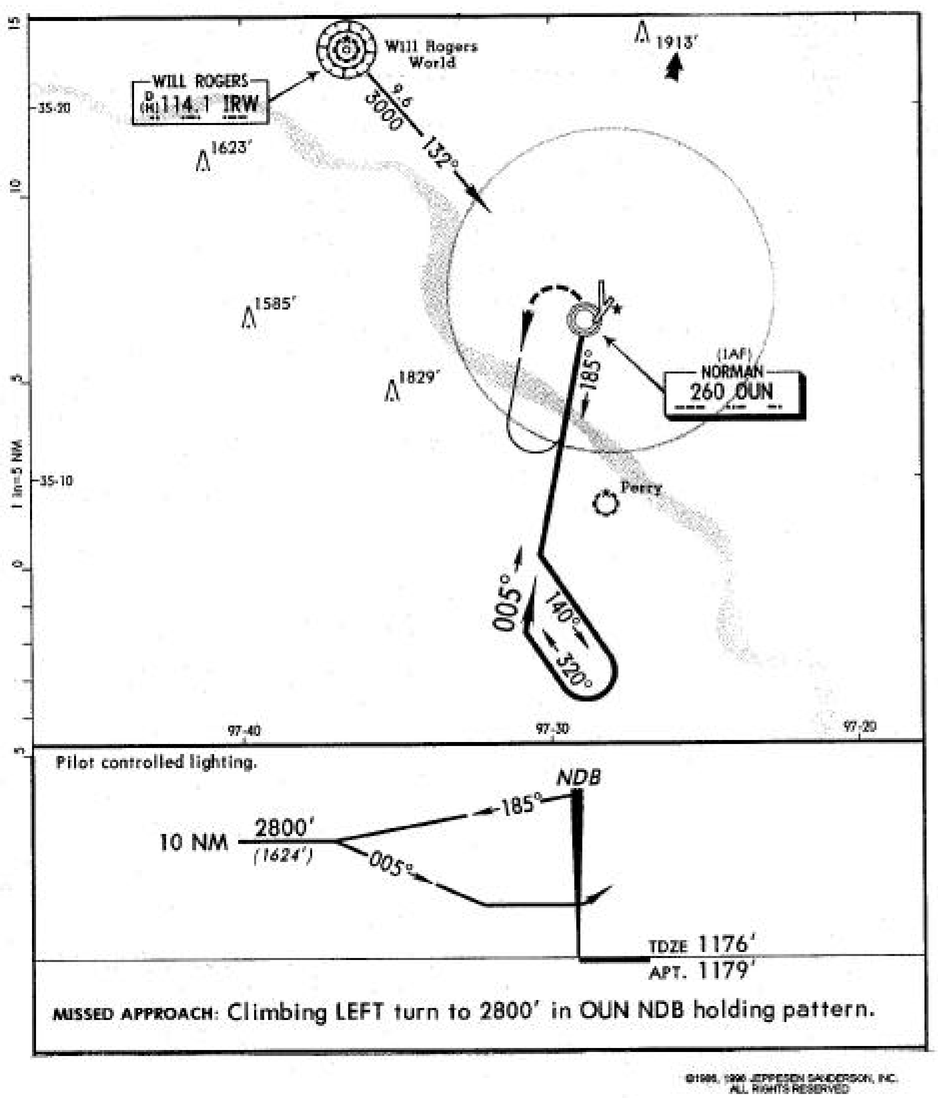

APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
N03	020	FN03	IF	OUN	E__F				01680	
N03	030	OUN	CF		E__M		0050	0040	01680	000
N03	040	OUN	HM		EEMH		0050	001T	02800	

ATTACHMENT 5 (cont'd)
PATH AND TERMINATOR

MISSED APPROACH CODING EXAMPLE 2

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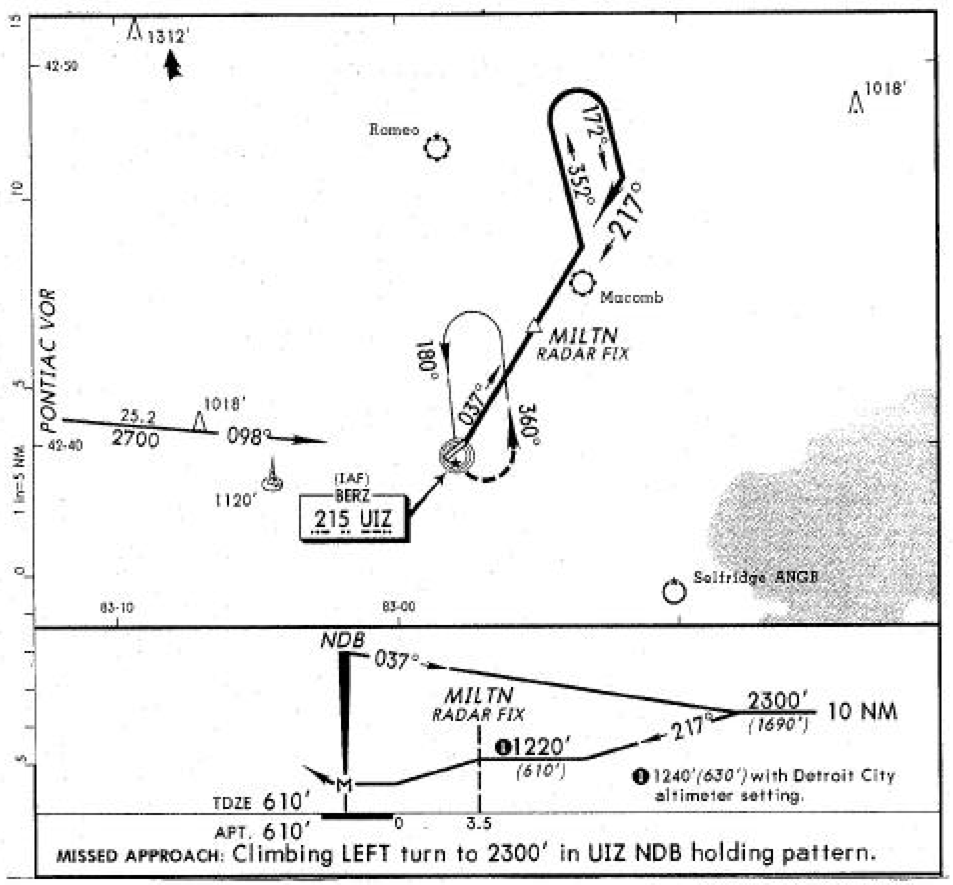

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APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
N22	020	MILTN	IF	UIZ	E__F				01220	
N22	030	UIZ	CF		E__M		2170	0040	01110	000
N22	040	UIZ	HM		EEMH		1800	001T	02300	

APPENDIX 1
CHRONOLOGY AND BIBLIOGRAPHY

1. Chronology

The AEEC Area Navigation Subcommittee established a working group at its September 1973 meeting in Los Angeles to look into the possibilities of standardizing RNAV system reference data format and encoding characteristics. The Subcommittee had observed that different RNAV system manufacturers were taking divergent paths with respect to reference data organization, and believed that, unless this trend was halted, the airline industry would be faced with the very high costs of supporting the production of data files in several different formats. Obvious economic benefits would result if this could be avoided.

The working group met for the first time in January 1974. It examined the approaches to reference data organization being taken by RNAV system manufacturers and, with the help of Jeppesen and Co., looked at the data whose characteristics needed definition. It established the philosophy concerning standardization stated in Section 1.2 of this Specification, and determined the path to follow to implement it. This was the vital first step in this activity, as it established where in the overall process of producing FDSU cassettes and ADEU cards the application of standardization would and would not yield cost benefits.

At its second and third meetings, held in March and May of 1974 respectively, the working group concentrated on defining characteristics for data elements. These included field content, record structure and file organization. Sufficient progress was made for a first draft of this Specification to be prepared for presentation to the RNAV Subcommittee for review.

The Subcommittee considered this first draft at its September 1974 meeting in Washington, D.C. It endorsed the principles established by the working group for the preparation of the draft. The Subcommittee concluded, however, that it should take on the rest of the specification-writing itself, building on the foundation represented by the draft. The working group was, therefore, disbanded. The Subcommittee's in-depth review of the draft produced numerous amendments and proposals for addition which, following the meeting, were incorporated into the document to produce the second draft.

The Subcommittee reviewed the second draft at its January 1975 meeting in Washington, D.C. Incorporation of the amendments developed at this meeting was felt by the Subcommittee to be all that was necessary to complete the Specification. The third draft, incorporating them, was approved by AEEC for publication at the General Session held in Washington, D.C. in the Spring of 1975.

2. Bibliography

The following is a list of AEEC letters associated with the preparation of ARINC Specification 424. A list of letters related to the RNAV Subcommittee's activities as a whole may be found in ARINC Report 299, "AEEC Letter Index."

AEEC LETTER NO.	DATE	SUBJECT
73-124/RNAV-87	Oct 8, 1973	Report of the Area Navigation Subcommittee Meeting held in Los Angeles, California, September 11th, 12th and 13th, 1973.
74-017/RNAV-89	Apr 2, 1974	Progress Report on the Activities of the RNAV Subcommittee's Data Format Standardization Working Group.
74-029/RNAV-90	Jun 17, 1974	Circulation of Draft No. 1 of Project Paper 424, "Area Navigation System Data Base Specification."
74-046/RNAV-94	Aug 7, 1974	Thomson CSF Comments on ARINC Characteristics 583 Synchro Excitation Provisions and on RNAV Data Format Standardization.
74-058/RNAV-95	Sep 26, 1974	Report of the Area Navigation Subcommittee Meeting Held September 17th, 18th and 19th, 1974 in Washington, D.C.
74-071/RNAV-97	Nov 14, 1974	Circulation of Draft No. 2 of Project Paper 424, "Area Navigation System Data Base Specification."
75-013/RNAV-99	Feb 27, 1975	Circulation of Draft No. 3 of Project Paper 424, "Area Navigation System Data Base Specification."
75-014/RNAV-100	Mar 7, 1975	Report of the Area Navigation Subcommittee Meeting held in Washington, D.C., January 21st, 22nd and 23rd, 1975.
75-018/RNAV-101	Mar 25, 1975	Additions to Project Paper 424 proposed by Jeppesen.

3. Meeting Attendees

The following people constituted the RNAV Subcommittee's Data Format Standardization Working Group and/or attended Subcommittee meetings held in September 1974 and January 1975.

APPENDIX 1 (cont'd)
CHRONOLOGY AND BIBLIOGRAPHY

AREA NAVIGATION SUBCOMMITTEE

AEEC Members and Airlines

F.W. Ungry, Chairman	UNITED AIRLINES	Chicago, Illinois
J.D. Wheeler	AMERICAN AIRLINES	Tulsa, Oklahoma
David Meredith	BRITISH AIRWAYS	London, England
H.F. McSweyn	NATIONAL AIRLINES	Miami, Florida
J.R. Reagan	PIEDMONT AIRLINES	Winston-Salem, North Carolina
Karl H. Riesen	SWISSAIR	Jamaica, New York
Phil Wirthlin	SWISSAIR	Zurich, Switzerland
T.G. Angelos	UNITED AIRLINES	Chicago, Illinois
T.A. Ellison	UNITED AIRLINES	San Francisco, California
Curt Humphrey	UNITED AIRLINES	San Francisco, California
D.H. Featherstone	AERONAUTICAL RADIO, INC.	Annapolis, Maryland

Manufacturers and Others

Francois Mourareau	AEROSPATIALE	Toulouse, France
Stanley W. Munson	AIR FORCE	Wright-Patterson AFB, Ohio
Morton Ross	ARMA/AMBAC	Garden City, New York
Philip T. Martin	BATTELLE	Columbus, Ohio
J.C. Lumsden	BENDIX AVIONICS	Ft. Lauderdale, Florida
J.G. Berzin	BOEING COMPANY	Seattle, Washington
Edward P. Donnelly	BOEING COMPANY	Edmonds, Washington
Phillip Fenner	BOEING COMPANY	Seattle, Washington
Gerald L. Moore	BOEING COMPANY	Seattle, Washington
Frank A. Rasmussen	BOEING COMPANY	Seattle, Washington
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Jack Ringland	COLLINS RADIO COMPANY	Cedar Rapids, Iowa
Marvin H. Schmidt	COLLINS RADIO COMPANY	Cedar Rapids, Iowa
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L. David Lewis	DELCO ELECTRONICS	Milwaukee, Wisconsin
Robert E. Oliver	DELCO ELECTRONICS	Goleta, California
Rudy Poklar	DELCO ELECTRONICS	Milwaukee, Wisconsin B. W.
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Roderic Nevin	EDMAC ASSOCIATES, INC.	East Rochester, New York
Adrian M. Zeffert	EDO COMMERCIAL CORPORATION	Melville, New York
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A.W. Randall	FEDERAL AVIATION ADMINISTRATION	Washington, D.C.
G. Tomsic	FEDERAL AVIATION ADMINISTRATION	Washington, D.C.
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Glen A. Gilbert	GILBERT ASSOCIATES	Washington, D.C.
Ira D. Ross	ITT AVIONICS	Nutley, New Jersey
Jack Davis	JEPPESEN & COMPANY	Denver, Colorado
M.J. Sommovigo	JEPPESEN & COMPANY	Washington, D.C.
James E. Terpstra	JEPPESEN & COMPANY	Denver, Colorado
John Cotton	LITTON AERO PRODUCTS DIV.	Woodland Hills, California
W.H. Harrison	LITTON AERO PRODUCTS DIV.	Woodland Hills, California
Wayne Kittner	LITTON AERO PRODUCTS DIV.	Woodland Hills, California
J. Van Der Bliek	LOCKHEED CALIFORNIA COMPANY	Burbank, California
Fred Ciechowski	RAYMOND ENGINEERING, INC.	Middletown, Connecticut
James H. Hill	RAYMOND ENGINEERING, INC.	Middletown, Connecticut
Martin R. Bates	SIERRA RESEARCH CORP.	Buffalo, New York
Frederick P. Allgower	SPERRY FLIGHT SYSTEMS	Phoenix, Arizona

APPENDIX 1 (cont'd)
CHRONOLOGY AND BIBLIOGRAPHY

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William Post	SPERRY FLIGHT SYSTEMS	Phoenix, Arizona
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APPENDIX 2
STRAIGHT-IN CRITERIA

Straight-in Criteria, FAA Type Procedures

Off-Airport Facility

The angle of convergence of the final approach course and extended runway centerline shall not exceed 30 degrees. The final approach course should be aligned to intersect the runway centerline at the runway threshold. However, when an operational advantage can be achieved, the point of intersection may be established as much as 3000 feet outward from the runway threshold. See Figure AP2-1.

On-Airport Facility

The angle of convergence of the final approach course and extended runway centerline shall not exceed 30 degrees. The final approach course should be aligned to intersect the runway centerline at a point 3000 feet outward from the runway threshold. When an operational advantage can be achieved, this point of intersection may be established at any point between the threshold and a point 5200 feet outward from the threshold. Also, where an operational advantage can be achieved, a final approach course which does not intersect the runway centerline, or which intersects it at a distance greater than 5200 feet from the threshold, may be established, provided that such a course lies within 500 feet laterally of the extended runway centerline at a point 3000 feet outward from the runway threshold. See Figure AP2-2.

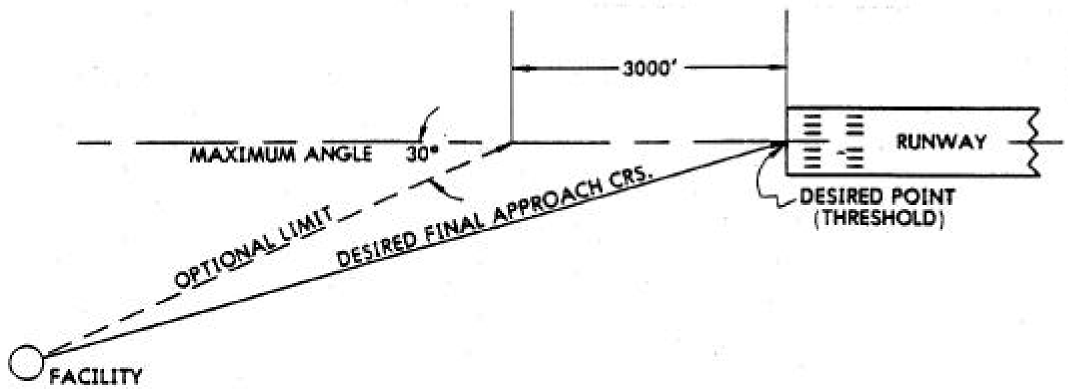

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Figure AP2-1
Alignment Options for Final Approach Course Off-Airport VOR with FAF, Straight-In Approach

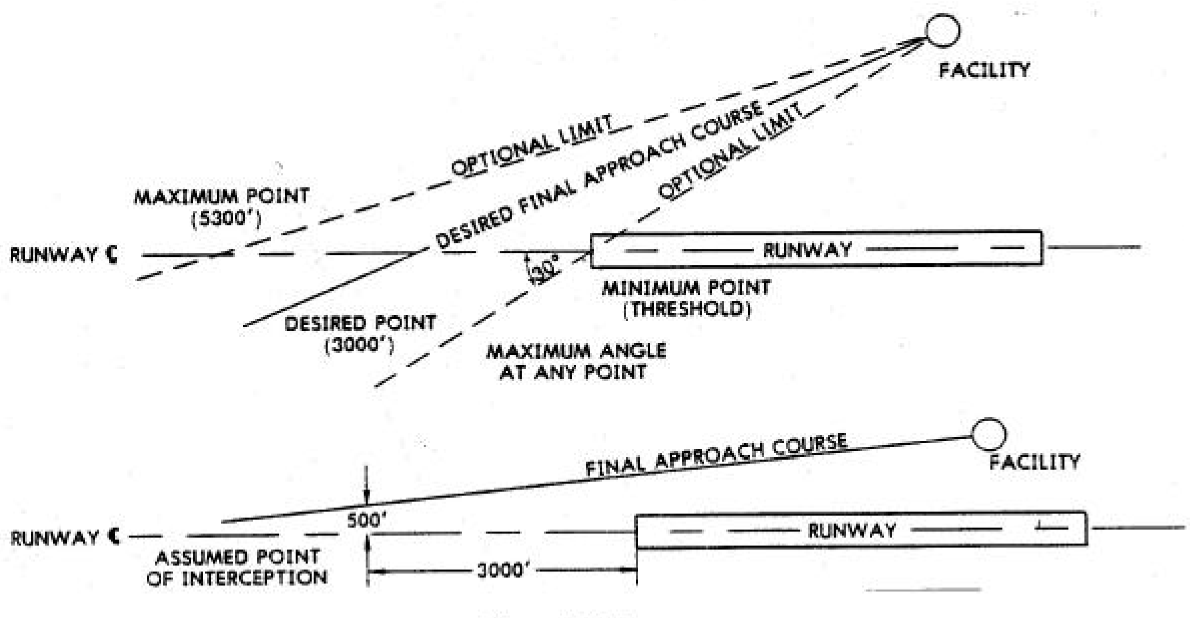

Figure AP2-2
Alignment Options for Final Approach Course On-Airport with FAF, Straight-In Approach

APPENDIX 2 (cont'd)
STRAIGHT-IN CRITERIA

Straight-in Criteria, ICAO Type Procedures

The alignment of the final approach track with the runway centerline determines whether a straight-in or circling approach may be established.

For a straight-in approach, the angle formed by the final approach track and the runway centerline shall not exceed 30 degrees and the distance between the runway threshold and the point oat which the final approach track intersects the runway centerline shall not be less than 900 meters. A final approach track which does not intersect the extended centerline of the runway may also be established, provided such a track lies within 150 meters laterally of the extended runway centerline at a point 900 meters outward from the runway threshold. See Figure AP2-3.

Missed Approach Point (MAP)

Off-Airport Facility - Straight-in Approach

The MAP is located at a point on the final approach track which is not farther from the FAF or facility than the threshold.

Off-Airport Facility - Circling Approach

The MAP is located at a point on the final approach track which is not farther from the FAF than the first usable portion of the landing surface.

On-Airport Facility

c-13 The MAP is located at a point on final approach track which is not farther from the FAF than the facility.

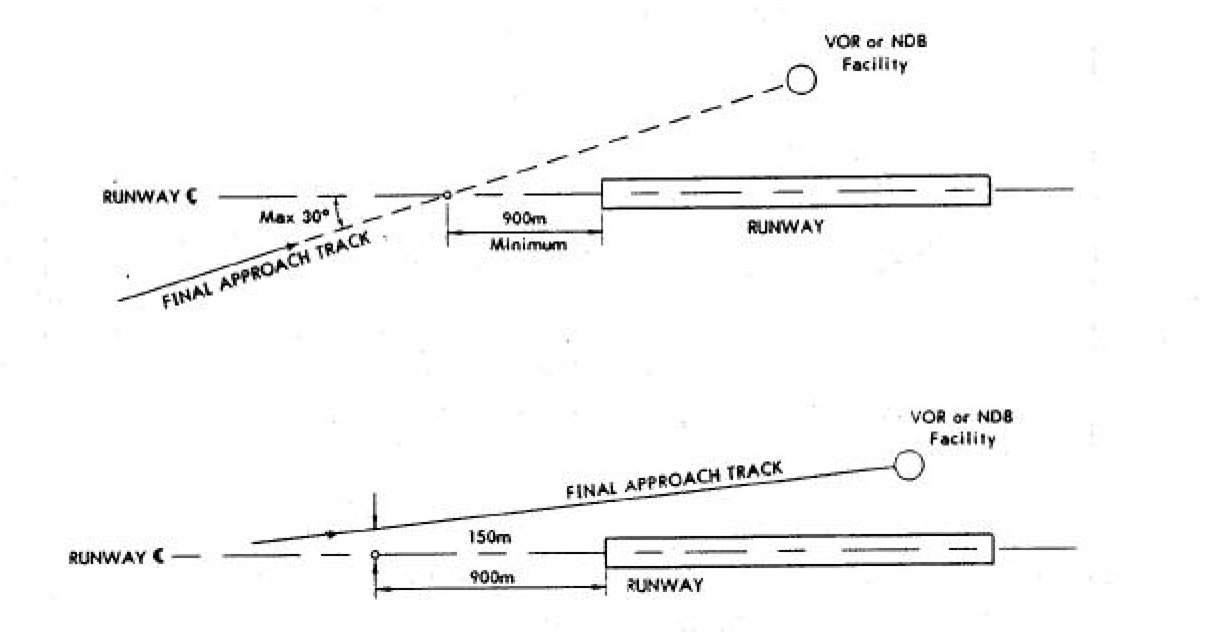

Figure AP2-3
Alignment Options for Final Approach Course Off-Airport VOR with FAF, Straight-In Approach

APPENDIX 3
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APPENDIX 3 (cont'd)
SUBJECT INDEX

AERONAUTICAL RADIO, INC.
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SUPPLEMENT 1

TO

ARINC SPECIFICATION 424

(AREA) NAVIGATION SYSTEM DATA BASE

Published: September 8, 1980

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: June 17, 1980

A. PURPOSE OF THIS SUPPLEMENT

This Supplement overhauls and extends the coverage of Specification 424 to enable the data base defined therein to support the navigation functions of ARINC 702 and similar flight management computers.

B. ORGANIZATION OF THIS SUPPLEMENT

The first part of this document, printed on goldenrod paper, contains descriptions of the changes introduced into the Specification by this Supplement. The second part consists of replacement white pages for the Specification modified to reflect these changes. The modified and added material on each replacement page is identified with c-1 symbols in the margins.

Existing copies of Specification 424 may be updated by inserting the replacement white pages where necessary and destroying the pages they displace. The goldenrod pages should be inserted inside the rear cover of the Specification.

Copies of the Specification bearing the number 424-1 already contain this Supplement and thus do not require revisions by the reader.

C. CHANGES TO ARINC SPECIFICATION 424 INTRODUCED BY THIS SUPPLEMENT

This Section presents a complete tabulation of the changes and additions to the Specification introduced by this Supplement. Each change or addition is entitled by the section number and title currently employed in the Specification, or by the section number and title that will be employed when the Supplement is eventually incorporated. In each case there is included a brief description of the addition or change and, for other than very minor revisions, any text originally contained in the Specification is reproduced for reference.

TITLE AND CHAPTER HEADINGS

Title of document changed from "Area Navigation System Data Base" to "Navigation System Data Base." "RNAV" changed to "Navigation" in chapter headings and in text.

1.2 Data Format Standardization Philosophy

Final two sentences of third paragraph of section amended to refer to new format standards for tailored company route data introduced into the document by this Supplement. Commentary added following first paragraph.

ORIGINAL TEXT FOLLOWS

(Final two sentences of third paragraph of 1.2)

A tailored record may contain data for which formatting rules may be found in this document, or data for which no such rules have been established. In the latter case, an arbitrary format will be used.

1.3 Organization of this Document

Second paragraph of section deleted to reflect deletion of ADEU card standards from the Specification by this Supplement.

ORIGINAL TEXT FOLLOWS

(Second paragraph of 1.3)

The document closes with a consideration of the standards applicable to the data cards employed with airborne Automatic Data Entry Units (ADEUs).

1.4 Reference Documents

ARINC Characteristic 702, "Flight Management Computer System" added to list of navigation systems with which the Specification 424 data base may be used.

2.1 Data Processing Terms

Definition for "card" deleted. Definition for "subsection" modified.

ORIGINAL TEXT FOLLOWS

Card — A data storage medium in the form of a thin flexible board on which information is encoded magnetically, by a pattern of punched holes, by a pattern of visible marks or by other means.

Subsection — A collection of records of functionally similar RNAV data items. The records for high level enroute airways form a subsection of the data base.

3.2.3 Navaid Section (D) NDB Subsection (DB)

New section introduced by this Supplement to introduce new master file subsection.

3.2.4 Enroute Section (E)

Section 3.2.3 of Specification 424 amended to include holding patterns and a new approach to airways classification. original Section 3.2.4 deleted.

ORIGINAL TEXT FOLLOWS

3.2.3 Enroute Section (E)

The Enroute section of the master airline user file should contain:

(i) all waypoints for EB, EH and EL airways,

(ii) all government-designated airways.

3.2.4 Holding Pattern Section (H)

The Holding Pattern section of the master airline user file should contain all holding patterns designated by governments for charting.

3.2.8 Airport Section (P) – Standard Instrument Departures (SIDs) Subsection (PD)

Second and third sentences of paragraph deleted.

ORIGINAL TEXT FOLLOWS

(Second and third sentences of 3.2.8)

Evaluation and conventional SIDs are not included in the master airline user file. They are, however, available in data banks in standard record format for those airlines that desire them.

3.2.9 Arrival Section (P) – Standard Terminal Arrival Routes (STARs) Subsection (PE)

Second and third sentences of paragraph deleted.

ORIGINAL TEXT FOLLOWS

Second and third sentences of 3.2.9)

Evaluation and conventional STARs are not included in the master airline user file. They are, however, available in data banks in standard record format for those airlines that desire them.

3.2.10 Airport Section (P) – Approach Routes Subsection (PF)

Section revised. Referenced figure (3-2) deleted.

ORIGINAL TEXT FOLLOWS

The Approach Route subsection of the master airline user file should contain all published RNAV approach routes to the airports referenced in Section 3.2.5 of this document. As illustrated in Figure 3-2, an approach route starts at the intermediate fix (IF) waypoint and ends at the missed approach holding waypoint. The published waypoints between these two waypoints are included, except for step-down fixes. Transitions from the enroute structure that proceed to the intermediate fix are included. Transitions from the enroute structure that proceed to the final approach fix (FAF) and require a course reversal are not included.

3.2.11 Airport Section (P) – Runways Subsection (PG)

Section revised to call for runway records to be included in the master airline user file.

ORIGINAL TEXT FOLLOWS

Runway records are not included in the master airline user file since they are not required for basic RNAV system operation. If needed for other operations, runway information is available in standard file and record format, and may be ordered by those persons needing it.

3.2.13 Company Route Section (R)

Section amended to delete statement that company route information is not included in the master airline user file.

ORIGINAL TEXT FOLLOWS

Company route information is available only as tailored records, and thus will not be included in the master airline user file. Formats for these tailored records are not specified in this document.

4.1 General

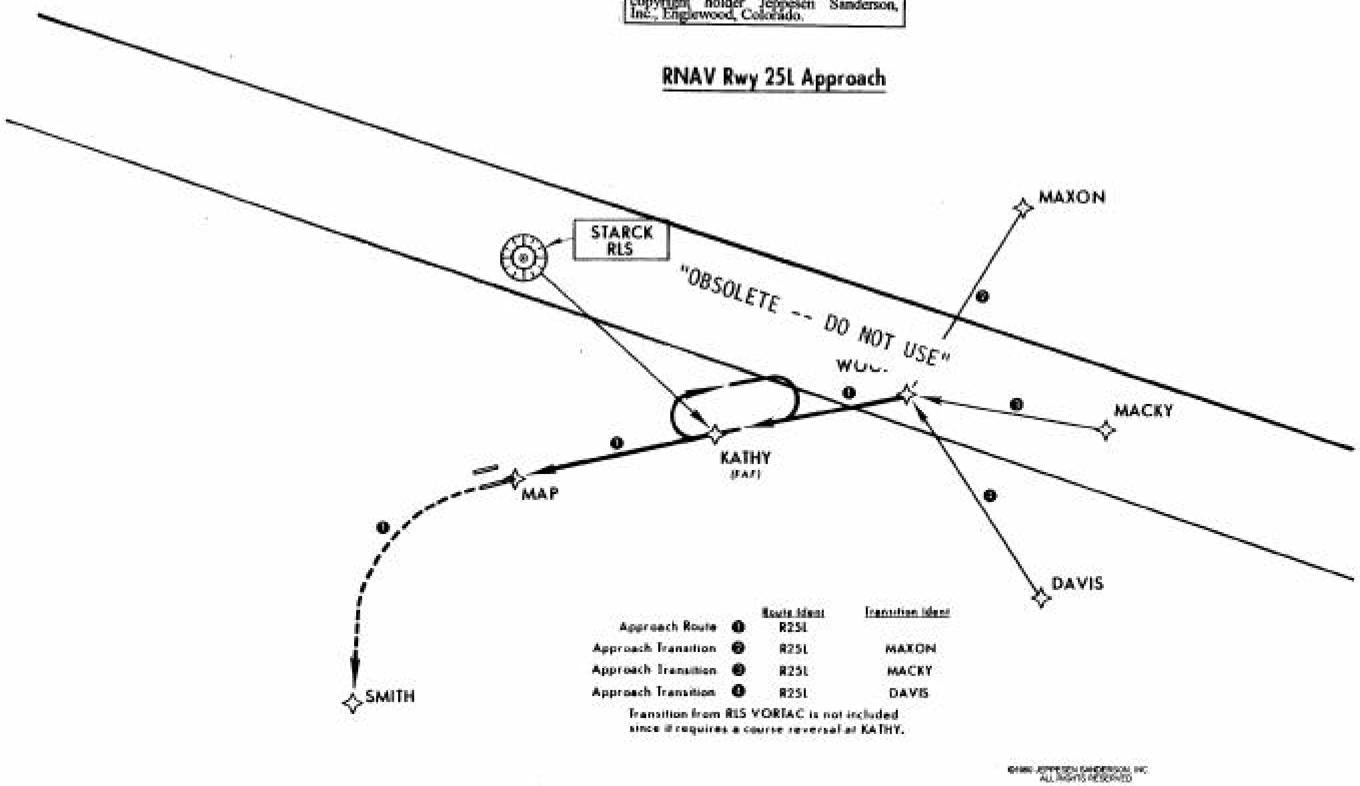
Section paragraph amended to indicate that the standard record length is increased from 108 to 132 columns.

ARINC STAFF NOTE: This record length increase affects every record layout description in Chapter 4. Also, changes in Chapter 5 introduced by this Supplement, yet to be described, further affect many of them. We are therefore presenting the whole of the original Chapter 4 as “ORIGINAL TEXT” for reference, marked “Obsolete – do not use.”

4.12 Company Route Records

New section added by this Supplement.

The copyrighted material in this RNAV Rwy 25L Approach Coding example is reproduced with the permission of the copyright holder Jeppesen Sanderson, Inc., Englewood, Colorado.



Not for navigational or other operational use. For example only. Please consult current navigation charts.

Figure 3-2

4.0 RNAV DATA – RECORD LAYOUT

4.1 General

Each record is made up of combinations of the fields described in Chapter 5 of this document. This chapter sets forth the standard layout of each type of record found in the data base. These layouts are also presented diagrammatically in Figure 4-1.

Each record contains 108 character positions or columns. Not all of these are used in every record. Some are left blank to permit like information to appear in the same columns of different records and others are reserved for the possible future expansion of the record's content. In the tables that follow, the former are identified by the term "Blank (Spacing)" under the "Field" heading. The latter are identified by the term "Reserved", followed by the function for which the reservation is made (where it can specifically be stated).

The tables show the record columns occupied by each field. For convenience, the number of characters in each field is shown in brackets following the field name. Also, the paragraph numbers in Chapter 5 of this document wherein individual fields are defined are referenced. Each table appears under a paragraph heading that is followed by the data base Section and Sub-section codes employed in the record described.

"OBSOLETE -- DO NOT USE"

4.2 Enroute Airways Records (EB, EH or EL)

The Enroute Airways file will contain the sequential listing of Both Level (EB), High Level (EH), and Low Level (EL) airways by geographic areas. ("Both Level" airways are airways not designated as either high level or low level). This file will also contain enroute off-airway waypoints by geographic area and altitude, without sequence numbers or airway idents.

4.2.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Sub-Section Code (1)	5.5
7 thru 10	Blank (Spacing) (4)	
11	Route Type (1)	5.7
12 thru 16	Route Identifier (5)	5.8
17	Reserved (6th char. Rt. Ident) (1)	Note 1
18 thru 23	Blank (Spacing) (6)	
24 thru 27	Sequence Number (4)	5.12
28 thru 32	Waypoint Identifier (5)	5.13
33	Reserved (6th char. Wpt. Ident) (1)	Note 1
34 thru 35	ICAO Code (2)	5.14
36	File Code (1)	5.15
37	Continuation Record No. (1)	5.16
38 thru 41	Waypoint Description Code (4)	5.17

4.2.1 Primary Records (cont'd)

Column	Field Name (Length)	Reference
42	Boundary Code (1)	5.18
43 thru 45	Forward Change-Over Point (To) (3)	5.19
46 thru 48	Backward Change-Over Point (From) (3)	5.20
49 thru 52	Recommended VHF NAVAID (4)	5.21
53 thru 56	First Reserved VHF NAVAID (4)	5.22
57 thru 60	Second Reserved VHF NAVAID (4)	5.23
61 thru 64	Theta (4)	5.24
65 thru 68	Rho (4)	5.25
69 thru 72	Outbound Magnetic Course (4)	5.26
73 thru 76	Route Distance From (4)	5.27
77 thru 80	Inbound Magnetic Course (4)	5.28
81 thru 99	Reserved (Expansion) (19)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

Note 1: The standard lengths for the Route Identifier and the Waypoint Identifier fields are each five characters. Some users envisage the need for six-character fields in certain instances. These reserved columns will permit this usage.

4.2.2 Continuation Records

Column	Field Name (Length)	Reference
1 thru 36	Fields as on Primary Records	
37	Continuation Record No. (1)	5.16
38 thru 80	Notes (43)	5.61
81 thru 99	Reserved (Expansion) (19)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

4.3 SID/STAR Records (PD or PE)

SID/STAR records comprise two files, one (PD) for SID's and the other (PE) for STAR's. The SID file contains the sequential listing of published Standard Instrument Departures. The STAR file contains the sequential listing of published Standard Terminal Arrival Routes.

4.3.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (Spacing) (1)	
7 thru 10	Airport ICAO Identifier (14)	5.6
11	Sub-Section Code (1)	5.5

4.0 RNAV DATA – RECORD LAYOUT (cont'd)

4.3.1 Primary Records (cont'd)

Column	Field Name (Length)	Reference
12 thru 16	SID/STAR Identifier (5)	5.9
17	Reserved (6th char. of SID/STAR Ident.) (1)	Note 1
18	Route Type (1)	5.7
19 thru 23	Transition Identifier (5)	5.11
24	Reserved (6th char. of Trans. Ident. (1)	Note 1
25 thru 27	Sequence Number (3)	5.12
28 thru 32	Waypoint Identifer (5)	5.13
33	Reserved (6th char of Wpt. Ident) (1)	Note 1
34 thru 35	ICAO Code (2)	5.14
36	File Code (1)	5.15
37	Continuation Record No. (1)	5.16
38 thru 41	Waypoint Description Code (4)	5.17
42	Blank (Spacing) (1)	
43 thru 45	Forward Change-Over Pt. (To) (3)	5.19
46 thru 47	Reserved (Path Termination) (2)	Note 2
48	Blank (Spacing) (1)	
49 thru 52	Recommended VHF NAVAID (4)	5.21
53 thru 56	First Reserved VHF NAVAID (4)	5.22
57 thru 60	Second Reserved VHF NAVAID (4)	5.23
61 thru 64	Theta (4)	5.24
65 thru 68	Rho (4)	5.25
69 thru 72	Outbound Magnetic Course (4)	5.26
73 thru 76	Route Distance From (4)	5.27
77 thru 80	Inbound Magnetic Course (4)	5.28
81	Altitude Descript (1)	5.29
82 thru 86	Altitude (5)	5.30
87 thru 91	Altitude (5)	5.30/Note 3
92 thru 99	Reserved (Expansion) (8)	
100 thru 104	File Record No. (5)	5.31
104 thru 108	Cycle Date (4)	5.32

Note 1: The standard lengths of the SID/STAR Identifier, the Transition Identifier and the Waypoint Identifier fields are five characters each. Some users envisage the need for six-character fields in certain cases. These reserved columns will permit this usage.

Note 2: This two-character field is reserved for the possible inclusion in the record of a Path Termination code. This code could be associated with the use of the airborne RNAV system to fly terminal ATC procedures not formulated in RNAV terms.

Note 3: The second altitude field (columns 87 thru 91) will be filled only when the Altitude Descript field contains the entry "B". Section 5.29 of this document refers.

"OBSOLETE -- DO NOT USE"

4.3.2 Continuation Records

Column	Field Name (Length)	Reference
1 thru 36	Fields as on Primary Records	
37	Continuation Record No. (1)	5.16
38 thru 80	Notes (43)	5.61
81 thru 99	Reserved (Expansion) (19)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

4.4 Approach Route Records (PF)

The Approach Routes file contains the sequential listing of Standard Instrument Approaches.

4.4.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (Spacing) (1)	
7 thru 10	Airport ICAO Identifier (4)	5.6
11	Sub-Section Code (1)	5.5
12 thru 16	Approach Identifier (5)	5.10
17	Reserved (6th char. of App. Ident) (1)	Note 1
18	Route Type (1)	5.7
19 thru 23	Transition Identifier (5)	5.11
24	Reserved (6th char. of Trans. Ident) (1)	Note 1
25 thru 27	Sequence No. (3)	5.12
28 thru 32	Waypoint Identifier (5)	5.13
33	Reserved (6th char. of Wpt. Ident) (1)	Note 1
34 thru 35	ICAO Code (2)	5.14
36	File Code (1)	5.15
37	Continuation Record No. (1)	5.16
38 thru 41	Waypoint Description Code (4)	5.17
42	Blank (Spacing) (1)	
43 thru 45	Forward Change-Over Pt. (To) (3)	5.19
46 thru 47	Reserved (Path Termination) (2)	Note 2
48	Blank (Spacing) (1)	
49 thru 52	Recommended VHF NAVAID (4)	5.21
53 thru 56	First Reserved VHF NAVAID (4)	5.22
57 thru 60	Second Reserved VHF NAVAID (4)	5.23
61 thru 64	Theta (4)	5.24
65 thru 68	Rho (4)	5.25
69 thru 72	Outbound Magnetic Course (4)	5.26
73 thru 76	Route Distance From (4)	5.27
77 thru 80	Inbound Magnetic Course (4)	5.28
81	Altitude Descript (1)	5.29
82 thru 86	Altitude (5)	5.30
87 thru 99	Reserved (Expansion) (13)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

4.0 RNAV DATA – RECORD LAYOUT (cont'd)

4.4.1 Primary Records (cont'd)

Note 1. The standard length of the Approach Identifier, the Transition Identifier and the Waypoint Identifier fields are five characters each. Some users envisage the need for six characters in certain cases. These reserved columns will permit this usage.

Note 2: This two-character field is reserved for the possible inclusion in the record of a Path Termination Code. This code could be associated with the use of the airborne RNAV system to fly terminal ATC procedures not formulated in RNAV terms.

4.4.2 Continuation Records

Column	Field Name (Length)	Reference
1 thru 36	Fields as on Primary Records	
37	Continuation Record No (1)	5.16
38 thru 80	Notes (43)	5.61
81 thru 99	Reserved (Expansion)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

4.5 VHF NAVAID Records (D)

The VHF NAVAID file contains details of all VOR, VOR/DME, VORTAC and TACAN stations in the geographic area of interest. For non-frequency paired VOR and TACAN stations having the same identifier the TACAN is stored.

4.5.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6 thru 11	Blank (Spacing) (6)	
12 thru 15	VOR Identifier (4)	5.33
16 thru 17	Blank (Spacing) (3)	
18 thru 19	ICAO Code (2)	5.14
20	Continuation Record No. (1)	5.16
21 thru 25	VOR Frequency (5)	5.34
26 thru 30	NAVAID Class (5)	5.35
31 thru 39	VOR Latitude (9)	5.36
40 thru 49	VOR Longitude (10)	5.37
50 thru 53	DME Ident (4)	5.38
54 thru 62	DME Latitude (9)	5.36
63 thru 72	DME Longitude (10)	5.37
73 thru 77	Station Declination (5)	5.66
78 thru 82	DME Elevation (5)	5.40
83	Reserved (NAVAID Priority No.) (1)	Note 1
84	Reserved (NAVAID Figure of Merit No.) (1)	Note 2
85 thru 99	Reserved (Expansion) (15)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

4.5.1 Primary Records (cont'd)

Note 1: "NAVAID Priority No.", although assigned by the FAA in the U.S. and used by them in facility flight test procedures, has no immediate applications in RNAV operations. The field is reserved, however, in case this situation changes.

Note 2: "NAVAID Figure of Merit No.", similarly, has no RNAV function. Should official approval be forthcoming, however, for the use of NAVAID's beyond ranges specified in the class field, this field could indicate the limitations of such use.

4.5.2 Continuation Records

Column	Field Name (Length)	Reference
1 thru 19	Fields as on Primary Records	
20	Continuation Record No. (1)	5.16
21 thru 40	Notes (20)	5.61
41 thru 99	Reserved (Expansion) (59)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

"OBSOLETE -- DO NOT USE"

4.6 Waypoint Records (EA or PC)

The Enroute Waypoint file contains all enroute on-airway and off-airway waypoints within a designed geographic area. The Terminal Waypoint file contains all terminal waypoints within the geographic area of each airport.

4.6.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Sub-Section Code (En-Route) (1)	5.5/Note 1
7 thru 10	Region Code (4)	5.41/ Note 2
11	Sub-Section Code (Terminal) (1)	5.5/Note 1
12 thru 16	Waypoint Identifier (5)	5.13
17	Reserved (6th char. Wpt. Ident) (1)	Note 3
18 thru 19	ICAO Code (2)	5.14
20	Continuation Record No. (1)	5.16
21 thru 24	Blank (Spacing) (4)	
25 thru 27	Waypoint Type (3)	5.42
28 thru 30	Blank (Spacing) (3)	
31 thru 39	Waypoint Latitude (9)	5.36
40 thru 49	Waypoint Longitude (10)	5.37
50 thru 74	Waypoint Name/Description (25)	5.43
75 thru 99	Reserved (Expansion) (25)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

4.0 RNAV DATA – RECORD LAYOUT (cont'd)

4.6.1 Primary Records (cont'd)

Note 1: In enroute waypoint records, the sub-section code occupies column 6 and column 11 is blank. In terminal waypoint records, the sub-section code occupies column 11 and column 6 is blank.

Note 2: In terminal waypoint records, the region code field contains the airport ICAO identification code.

Note 3: The standard length for the waypoint identifier field is 5 characters. Some users envisage the need for 6 characters in certain cases. This reserved column will permit this usage.

4.6.2 Continuation Records

Column	Field Name (Length)	Reference
1 thru 19	Fields as on Primary Records	
20	Continuation Record No. (1)	5.16
21 thru 40	Notes (20)	5.61
41 thru 99	Reserved (Expansion) (59)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

4.7 ILS (Localizer and Glide Slope) Records (PI)

This file will contain a sequential listing of a localizer/glide slope systems.

4.7.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (Spacing) (1)	
7 thru 10	Airport ICAO Identifier (4)	5.6
11	Sub-Section Code (1)	5.5
12 thru 15	Localizer Identifier (4)	5.44
16 thru 17	Blank (Spacing) (2)	
18 thru 19	ICAO Code (2)	5.14
20	Continuation Record No. (1)	5.16
21 thru 25	Localizer Frequency (5)	5.45
26 thru 30	Runway Identifier (5)	5.46
31 thru 39	Localizer Latitude (9)	5.36
40 thru 49	Localizer Longitude (10)	5.37
50 thru 53	Localizer Bearing (4)	5.47
54 thru 62	Glide Slope Latitude (9)	5.36
63 thru 72	Glide Slope Longitude (10)	5.37
73 thru 76	Localizer Position (4)	5.48
77	Localizer Position Reference (1)	5.49
78 thru 81	Glide Slope Position (4)	5.50
82 thru 85	Localizer Width (4)	5.51

"OBSOLETE -- DO NOT USE"

4.7.1 Primary Records (cont'd)

Column	Field Name (Length)	Reference
86 thru 88	Glide Slope Angle (3)	5.52
89 thru 93	Station Declination (5)	5.66
94 thru 95	Glide Slope Height at Landing Threshold (2)	5.67
96 thru 99	Reserved (Expansion) (4)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

4.7.2 Continuation Records

Column	Field Name (Length)	Reference
1 thru 19	Fields as on Primary Records	
20	Continuation Record No. (1)	5.16
21 thru 99	Notes (79)	5.61
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

Any future expansion of the file needed to accommodate landing guidance aids other than ILS localizers and glide slopes (e.g. marker beacons) will be handled by the continuation record capability specified above.

4.8 Airport Records (PA)

This file contains airport information.

4.8.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (Spacing) (1)	
7 thru 10	Airport ICAO Identifier (4)	5.6
11	Sub-Section Code (1)	5.5
12 thru 17	Blank (Spacing) (6)	
18 thru 19	ICAO Code (2)	5.14
20	Continuation Record No. (1)	5.16
21 thru 25	Transition Altitude (5)	5.53
26 thru 27	Airport Class (2)	5.54
28 thru 30	Blank (Spacing) (3)	
31 thru 39	Airport Reference Pt. Latitude (9)	5.36
40 thru 49	Airport Reference Pt. Longitude (10)	5.37
50 thru 74	Notes (25)	5.60
75 thru 79	Magnetic Variation (5)	5.39
80 thru 84	Airport Elevation (5)	5.55
85 thru 99	Reserved (Expansion) (15)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

4.0 RNAV DATA – RECORD LAYOUT (cont'd)

4.8.2 Continuation Records

Column	Field Name (Length)	Reference
1 thru 19	Fields as on Primary Records	
20	Continuation Record No. (1)	5.16
21 thru 40	Notes (20)	5.61
41 thru 99	Reserved (Expansion) (59)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

4.9 Gate Records (PB)

This file contains passenger gate information.

4.9.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (Spacing) (1)	
7 thru 10	Airport ICAO Identifier (4)	5.6
11	Sub-Section Code (1)	5.5
12 thru 16	Gate Identifier (5)	5.56
17	Blank (Spacing) (1)	
18 thru 19	ICAO Code (2)	5.14
20	Continuation Record No. (1)	5.16
21 thru 30	Blank (Spacing) (10)	
31 thru 39	Gate Latitude (9)	5.36
40 thru 49	Gate Longitude (10)	5.37
50 thru 74	Notes (25)	5.60
75 thru 99	Reserved (Expansion) (25)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

4.9.2 Continuation Records

Column	Field Name (Length)	Reference
1 thru 19	Fields as on Primary Records	
20	Continuation Record No. (1)	5.16
21 thru 40	Notes (20)	5.61
41 thru 99	Reserved (Expansion) (59)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

4.10 Runway Records (PG)

This file contains runway information.

4.10.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (Spacing) (1)	

"OBSOLETE -- DO NOT USE"

4.10.1 Primary Records (cont'd)

Column	Field Name (Length)	Reference
7 thru 10	Airport ICAO Identifier (4)	5.6
11	Sub-Section Code (1)	5.5
12 thru 16	Runway Identifier (5)	5.46
17	Blank (Spacing) (1)	
18 thru 19	ICAO Code (2)	5.14
20	Continuation Record No. (1)	5.16
21 thru 25	Runway Length (5)	5.57
26 thru 29	Runway Magnetic Bearing (4)	5.58
30	Blank (Spacing) (1)	
31 thru 39	Runway Latitude (9)	5.36
40 thru 49	Runway Longitude (10)	5.37
50 thru 51	Reserved (ECS* use) (2)	
52 thru 57	Reserved (ECS* use) (6)	
58	Blank (Spacing) (1)	
59 thru 64	Reserved (ECS* use) (6)	
65 thru 86	Runway Description (22)	5.59
87 thru 91	Landing Threshold Elevation (5)	5.68
92 thru 99	Reserved (Expansion) (8)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

* ECS = Electronic Chart System

4.10.2 Continuation Records

Column	Field Name (Length)	Reference
1 thru 19	Fields as on Primary Records	
20	Continuation Record No. (1)	5.16
21 thru 40	Notes (20)	5.61
41 thru 99	Reserved (Expansion) (59)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

4.11 Holding Pattern Records (H)

The holding pattern file contains the holding patterns recommended by the offical government source for inclusion on aeronautical navigation charts.

4.11.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (Spacing) (1)	
7 thru 10	Region Code (4)	5.41
11 thru 27	Blank (Spacing) (17)	
28 thru 32	Waypoint Identifier (5)	5.13
33	Reserved (6th character of Wpt. Ident) (1)	Note 1
34 thru 35	ICAO Code (2)	5.14
36	File Code (1)	5.15

4.0 RNAV DATA – RECORD LAYOUT (cont'd)

4.11.1 Primary Records (cont'd)

Column	Field Name (Length)	Reference
37	Continuation Record No. (1)	5.16
38 thru 41	Inbound Holding Course (4)	5.62
42	Turn (1)	5.63
43 thru 45	Leg Length (3)	5.64
46 thru 47	Leg Time (2)	5.65
48 thru 52	Altitude (5)	5.30
53 thru 76	Notes (24)	5.60
77 thru 99	Reserved (Expansion) (23)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

Note 1: The standard length of the Waypoint Identifier field is five characters. Some users envisage the need for a six-character field in certain cases. This reserved column will permit this usage.

4.11.2 Continuation Records

"OBSOLETE -- DO NOT USE"

Column	Field Name (Length)	Reference
1 thru 36	Fields as on Primary Records	
37	Continuation Record No. (1)	5
38 thru 57	Notes (20)	
58 thru 99	Reserved (Expansion) (42)	
100 thru 104	File Record No. (5)	5.31
105 thru 108	Cycle Date (4)	5.32

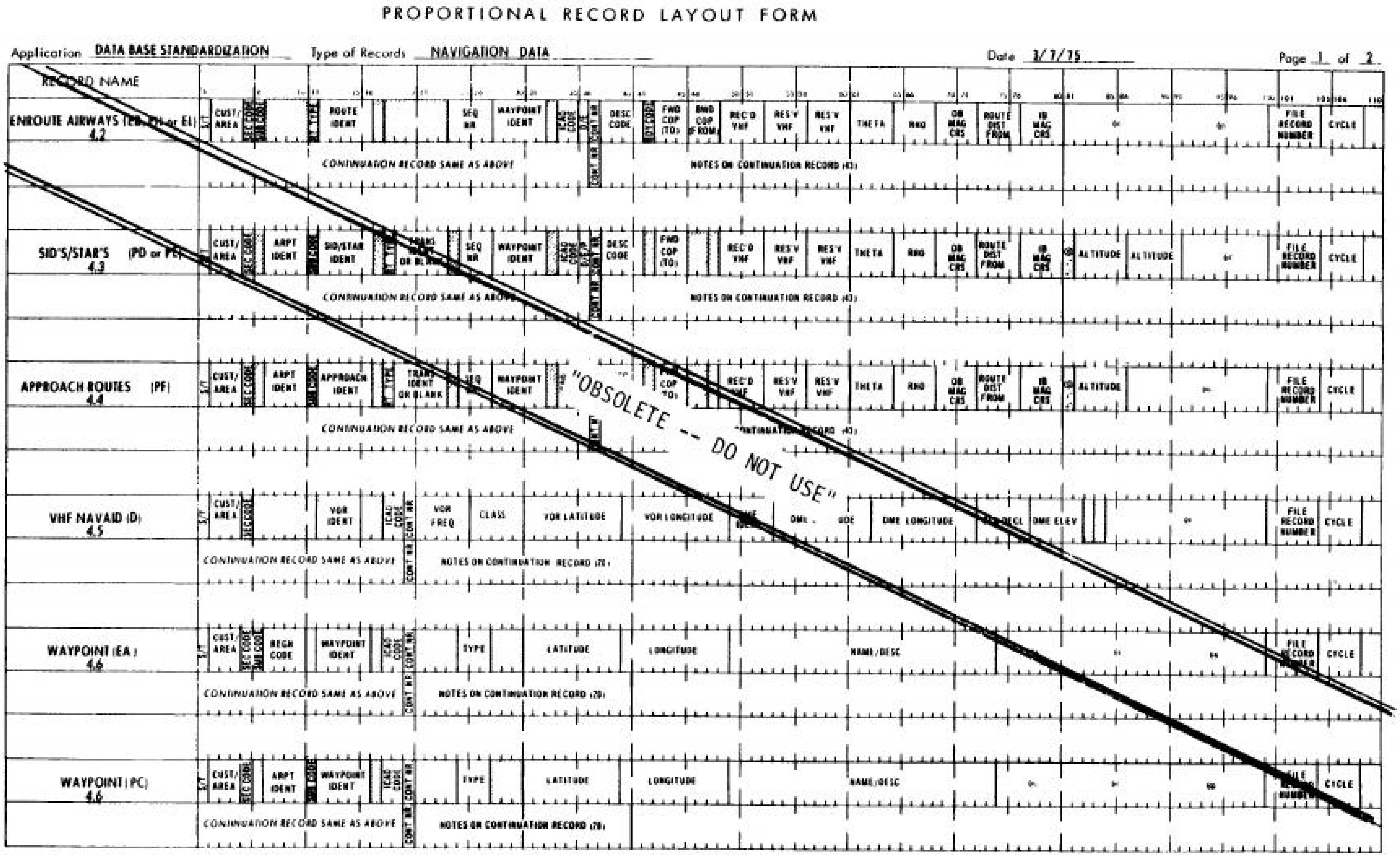

PROPORTIONAL RECORD LAYOUT FORM
Application DATA BASE STANDARDIZATION
Type of Records NAVIGATION DATA
Date 3/7/75
Page 1 of 2
RECORD NAME
ENROUTE AIRWAYS (ER, EI or EI) 4.2
SID'S/STAR'S (PD or PE) 4.3
APPROACH ROUTES (PF) 4.4
VHF NAVAID (D) 4.5
WAYPOINT (EA) 4.6
WAYPOINT (PC) 4.6
CONTINUATION RECORD SAME AS ABOVE
NOTES ON CONTINUATION RECORD
"OBSOLETE -- DO NOT USE"

Figure 4-1

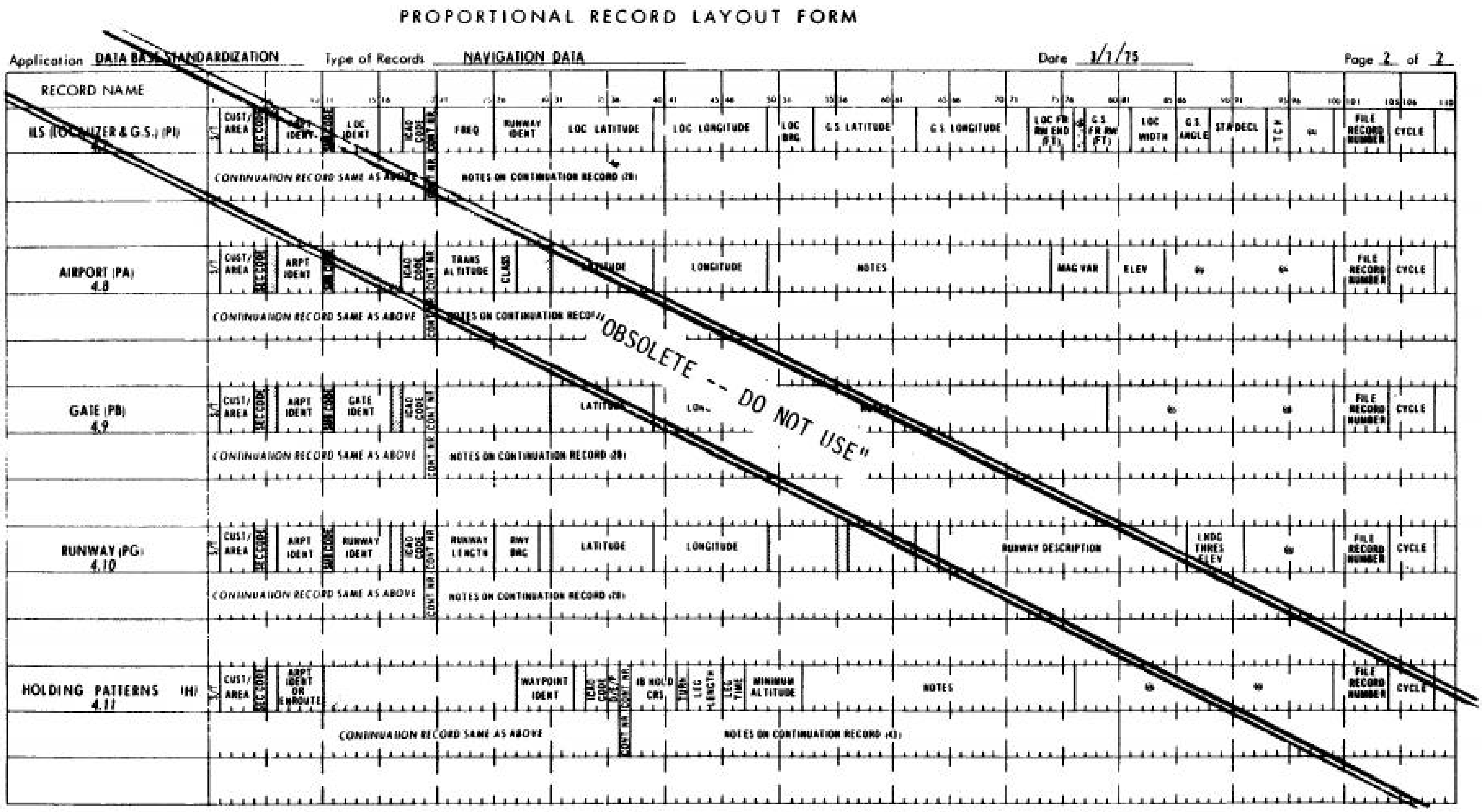


Figure 4-1 (cont'd)

AERONAUTICAL RADIO, INC.
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SUPPLEMENT 2

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: February 5, 1982

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: December 9, 1981

A. PURPOSE OF THIS SUPPLEMENT

This Supplement corrects typographical and editorial errors in Specification 424-1 and introduces a number of clarifying amendments.

B. ORGANIZATION OF THIS SUPPLEMENT

The first part of this document, printed on goldenrod paper, contains descriptions of the changes introduced into the Specification by this Supplement, and where appropriate, extracts from the original text for comparison purposes. The second part consists of replacement white pages for the Specification modified to reflect these changes. The modified and added material on each replacement page is identified with c-2 symbols in the margins.

Existing copies of Specification 424-1 may be updated by inserting the replacement white pages where necessary and destroying the pages they displace. The goldenrod pages should be inserted inside the rear cover of the Specification, following Supplement 1.

C. CHANGES TO ARINC SPECIFICATION 424 INTRODUCED BY THIS SUPPLEMENT

This Section presents a complete tabulation of the changes and additions to the Specification introduced by this Supplement. Each change or addition is identified using the section number and title currently employed or the section number and title that will be employed when the Supplement is eventually incorporated. In each case there is included a brief description of the addition or change.

1.2 Data Format Standardization Philosophy

Commentary added.

2.2 Special Navigation Terms

The words “terminal structure” are substituted for the words “approach structure” in definition for Transition Essential Waypoints.

3.2.2 VHF NAVAID Section (D)

New sentence added to existing text.

3.2.5 Airport Section (P) – Airport Reference Point Subsection (PA)

Runway length and instrument approach restriction deleted.

ORIGINAL TEXT FOLLOWS

3.2.5 Airport Section (P) – Airport Reference Point Subsection (PA)

The Airport Reference Point Subsection of the master airline user file should contain reference points for all airports having at least one hard-surfaced runway of 4000 feet length or greater, for which an approved instrument approach procedure is published.

3.2.12 Airport Section (P) – ILS NAV DATA Subsection (PI)

Sentence added to existing text. Commentary added.

4.4.1 Primary Records

Columns 30 and 31 (previously blank for spacing reasons) assigned to “Waypoint Usage” coding described in Section 5.82. Figure 4-1 amended to reflect this change.

5.7 Route Type (RT TYPE)

Line added to Enroute Airways Record table defining field content “B” and “Both (High/Low)” airway type.

STAR Record table amended to add word “Transition” to “Profile Descent Enroute” entry.

5.10 Approach Route Identifier (APPROACH IDENT)

Field length reduced from 5 characters max. to 4 characters max. Example “B8R” changed to “B08R.”

5.11 Transition Identifier (TRANS IDENT)

Table (ii) revised completely.

Example “TRAIL” changed to “RW08R.”

ORIGINAL TEXT FOLLOWS

Record	“Route Type” Field Content	“Transition Identifier” Field Content
SID/STAR	1 or 4	SID runway transition identifier
	2 or 5	Blank/RWY/All/Other
	3 or 6	SID Enroute transition identifier
	1, 4, or 7	STAR enroute transition identifier
	2, 5, or 8	Blank/RWY/All/Other
	3, 6, or 9	STAR runway transition identifier
Approach Routes	A	Waypoint identifier of first waypoint of transition
	All other possible entries	Blank

Table (ii)
Transition Identifier Field Content

5.17 Waypoint Description Code (DESC CODE)

Table (iii) modified.

ORIGINAL TEXT FOLLOWS

Waypoint Description	Record Column Content			
	40	41	42	43
Airport W/P	A			
Essential W/P*	E			
Off-Airway W/P*	F			
Runway W/P	G			
Non-Essential W/P*	R			
Transition Essential W/P*	T			
VOR, VORDME, VORTAC	V			
End of Continuous Airway		E		
Overfly**		Y		
ATC Compulsory W/P*			C	
Gateway Fix			G	
First Leg of Missed Approach			M	
Holding Fix				H

* See Chapter 2 for definitions.

** Fix must be overflown before turning.

Note: Column 40 may be blank on some SID/STAR/APPROACH records.

Table (iii)
Waypoint Description Codes

5.22 Turn Direction Valid (TDV)

Definition/Description amended.

ORIGINAL TEXT FOLLOWS

Definition/Description: This field is used to indicate that a turn is required prior to executing the Path Term defined in a terminal procedure.

5.23 Recommended VHF NAVAID (REC'D VHF)

Note added after "Definition/Description" paragraph.

5.29 Altitude Descript (ALT DESC)

Field contents "G" and "I" and their associated waypoint crossing definitions added to Source/Content table. Second sentence added to first note.

5.32 Cycle Data (CYCLE)

Two sentences added to "Definition/Description" paragraph.

5.35 NAVAID Class (CLASS)

Sentence added to note under table (v).

5.54 Airport Class (CLASS)

Definition/Description paragraph and Source/Content table revised.

ORIGINAL TEXT FOLLOWS

5.54 Airport Class (CLASS)

Definition/Description: The "Airport Class" field permits airports to be classified on the basis of available runway length.

Source/Content: The first character of the field is selected from the following table. The second character position is blank.

Available Runway	Field Entry
6000 feet and over	A
5000 to 5999 feet	B
4000 to 4999 feet	C

Used On: Airport records
Length: 2 characters max.
Character Type: Alpha

5.64 Leg Length (LEG LENGTH)

Definition/Description revised to define leg length (distance) as the distance between the point at which the airport rolls out on the inbound leg and the fix at which the holding pattern is defined. Figure 5-4 amended to reflect this change.

ORIGINAL TEXT FOLLOWS

Definition/Description: The "Leg Length" field specifies the diagonal distance from the holding waypoint to the end of the outbound leg of a holding pattern.

5.66 Station Declination (STN DEC)

"G" entry added to Source/Content description.

5.70 Vertical Angle (VERT ANGLE)

Definition/Description and Source/Content paragraphs modified. Figure 5-5 revised to increase range of vertical angle and to correct formula for vertical angle computation.

ORIGINAL TEXT FOLLOWS

5.70 Vertical Angle (VERT ANGLE)

Definition/Description: "Vertical Angle" will be specified on the runway waypoint of approaches. The angle should cause the aircraft to fly level, then descend.

Source/Content: Values from official government sources will be used when available. The value may be computed from the FAF to a point 50 feet above the runway threshold. The range shall be 2.40 to 3.77 degrees (3.00 degrees nominal), with decimal point suppressed. (See Figure 5-5.)

Used On: Approach Routes records, STAR records, Runway records
Length: 4 characters
Character Type: Numeric
Examples: -250, -300, 360

5.70 Vertical Angle (VERT ANGLE) (cont'd)

Note: Vertical angle will be included in runway records only when runway has published straight-in landing minimums.

5.82 Waypoint Usage

New section added by this Supplement.

Attachment 2 – Waypoint Identifiers

Back course marker prefix in Section F1 changed from "SM" to "BM."

Attachment 3 – Navigation Chart/File Date Relationship

New version of computer print-out of the master user tape file data equivalent to the chart examples in this attachment substituted for that existing.

ARINC STAFF NOTE: Since this material is illustrative only, we are not reproducing the original version for reference in this Supplement.

Attachment 5 – Path and Terminator

New version of this attachment introduced by this Supplement. The pages of the original version of Attachment 5 follow, marked "Obsolete – Do Not Use."

ATTACHMENT 5 *

PATH AND TERMINATOR

Path Terminators are assigned to all SID/STAR/Approach records in accordance with the rules set forth in this Attachment.

GENERAL RULES

A. The following leg types are NAVAID oriented and the defining parameters will be found in the RECD VHF, RHO, THETA, OB MAG CRS, and WAYPOINT IDENT fields:

AF	CI	FC	FM	VD
CF	FA	FD	PI	VR

B. The first and last legs of a SID/STAR/Approach will be selected from the following leg types:

Procedure	Beginning Leg	Ending Leg
SID	CF, DF, FA, FC, [illegible]F VA, VD, VI, VR [illegible]r VM followed by C[illegible]F	AF, CF, DF, HA, IF
STAR	AF, FC, F[illegible]	AF, CF, DF, FM, TF, VM
SID Route Transition	AF, FA[illegible]FD, IF, TF	AF, CF, DF, TF
STAR Route Transition	AF, FC, FD, IF	AF, CF, DF, HA, HM, TF
SID Runway Transition	AF, FA, FC, FD, IF	AF, CF, HF, HM, TF
STAR Runway Transition	AF, FA, FD, HF, IF, PI	AF, CF, HF, HM, PI, TF, VI (LOC only)
Approach	IF	CF
Missed Approach	CF, FA, FC, FD, FM, VA, VD , VI, VM, VR	AF, CF, DF, FM, HM, TF, VA, VM

NOTE: Approach transitions and Profile Descent runway transitions will be coded with the same set of beginning and ending legs as a STAR Runway Transition.

C. Table 1 defines permitted leg sequences. A shaded square indicates that the current leg/next leg sequence is not allowed.

D. Table 2 illustrates the leg types available for coding.

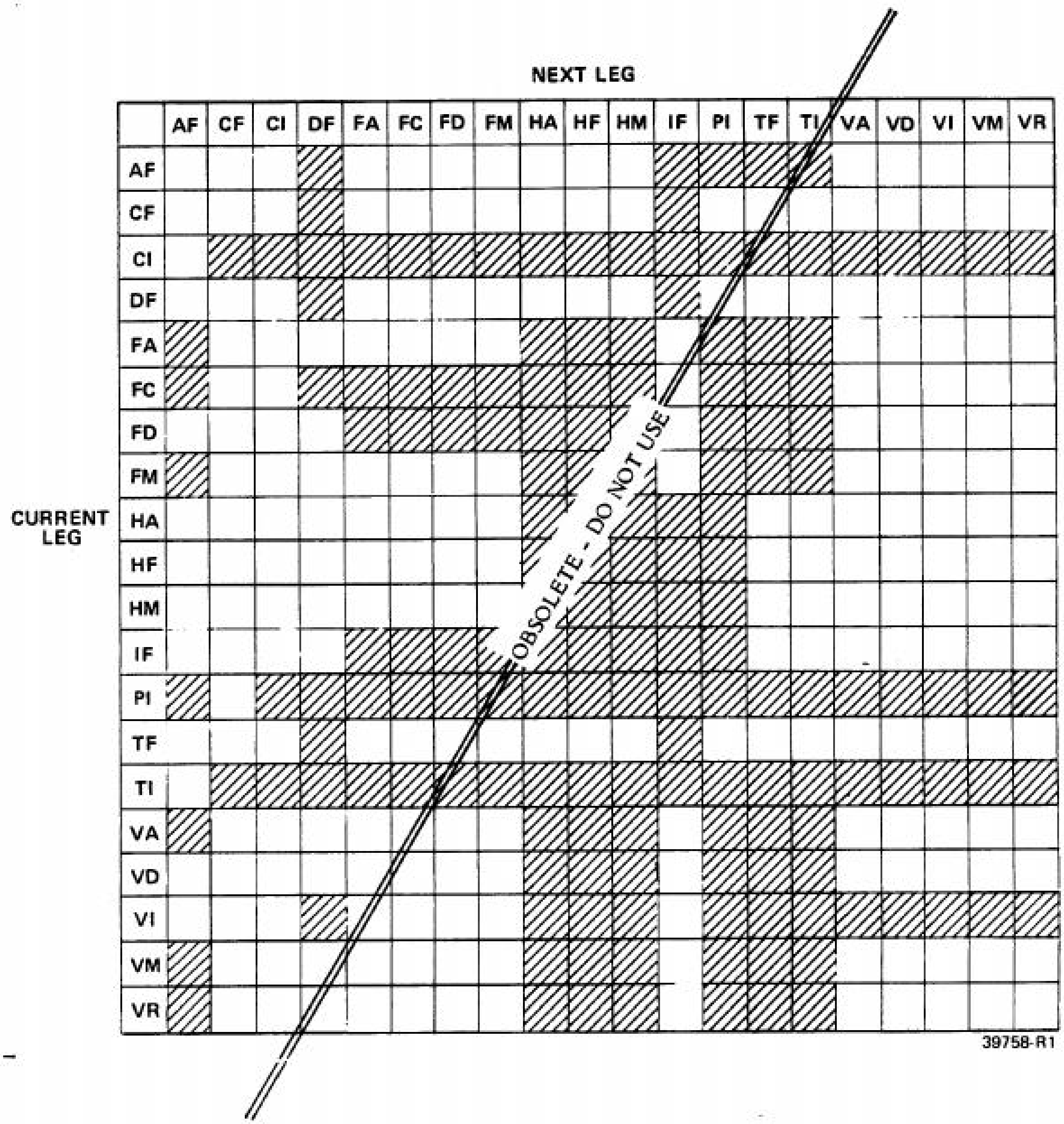
* THIS ATTACHMENT WAS INTRODUCED INTO SPECIFICATION 424 BY SUPPLEMENT NO. 1.

OBSOLETE - DO NOT USE

ATTACHMENT 5 (cont'd)

PATH AND TERMINATOR

GENERAL RULES

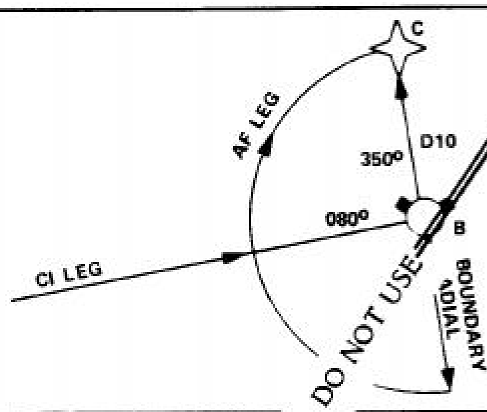
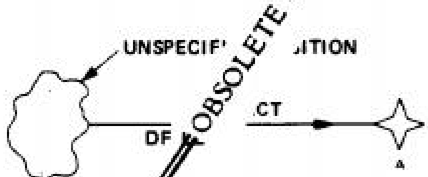
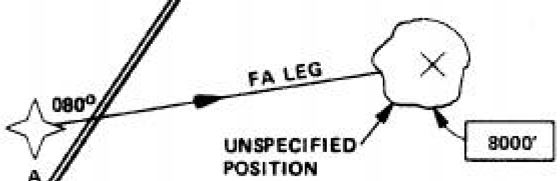


Leg Sequence
Table 1

ATTACHMENT 5 (cont'd)

PATH AND TERMINATOR

GENERAL RULES

Leg(s)	Example	Description
CF		Course to a fix
CI-AF		Course to a fix terminating at the intercept (CI leg) of the next leg, followed by a DME arc to a fix (AF leg). The DME arc is defined by a boundary radial, a turn direction, and a fix on the arc. Waypoint is not required at intersection of CI and AF leg.
DF		Computed track direct to a fix
FA		Course from a fix to an altitude
FC		Course from a fix to a distance

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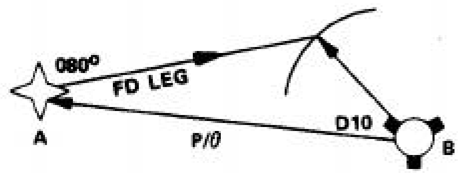
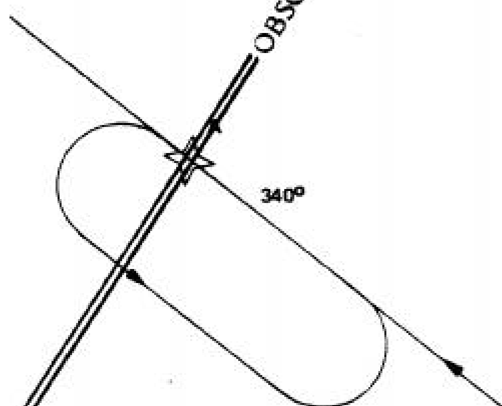
OBSOLETE - DO NOT USE

Leg Type Illustrations
Table 2

ATTACHMENT 5 (cont'd)

PATH AND TERMINATOR
GENERAL RULES

Leg(s)	Example	Description
FD		Course from a fix to a DME distance
FM		Course from a fix to a manual termination
HF HA HM		Holding pattern terminating: automatically at the fix after one full circuit (HF) automatically at a fix after reaching an altitude (HA) manually (HM)
IF		Initial fix

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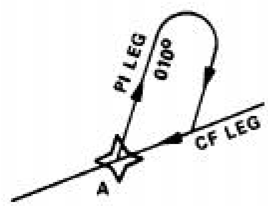
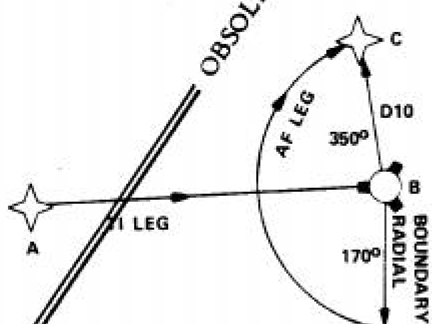
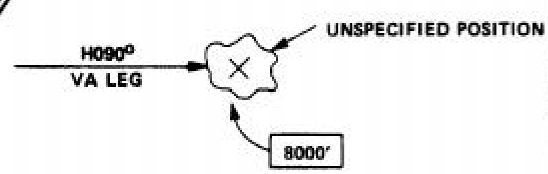
OBSOLETE - DO NOT USE

Leg Type Illustrations
Table 2 (cont)

ATTACHMENT 5 (cont'd)

PATH AND TERMINATOR

GENERAL RULES

Leg(s)	Example	Description
PI-CF		Procedure turn (PI) followed by a course to a fix (CF)
TF		Track between two fixes (great circle)
TI-AF		Track to a next leg (TI) followed by a constant DME arc to a fix (AF). Waypoint is not required at intersection of TI and AF leg.
VA		Heading to an altitude (position unspecified)

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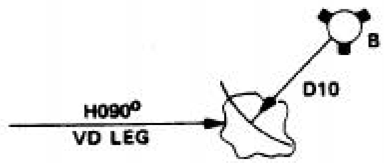
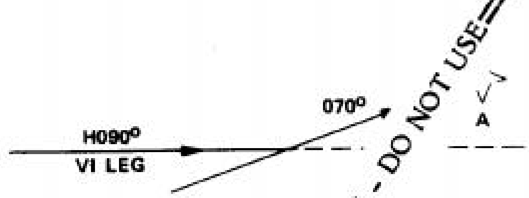
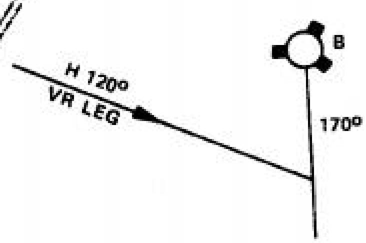
OBSOLETE - DO NOT USE

Leg Type Illustrations
Table 2 (cont)

ATTACHMENT 5 (cont'd)

PATH AND TERMINATOR GENERAL RULES

OBSOLETE - DO NOT USE

Leg(s)	Example	Description
VD		Heading to a DME distance
VI-CF		Heading to a next leg (VI) followed by a course to a fix (CF) Intercept point undefined.
VM		Heading to a manual termination
VR		Heading to a radial termination Intercept point undefined.

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Leg Type Illustrations
Table 2 (cont)

Table 2 (cont)

ATTACHMENT 5 (cont'd)

E. Table 3 lists the required and optional parameters used to define each leg type. An "0" in Table 3 indicates that the parameter may be omitted or included as required for an individual case. All other entries in the table indicate that the field is required for leg definition.

F. All procedures will be coded to provide guidance specified by source documents.

G. DF legs will be used to start from unknown positions such as altitude or DME terminations.

H. Vertical angles are referenced to the next fix.

I. Use of a "C" in the Altitude Description field is restricted to SID records with the following path and terminator codes:

CF	FD	VR
FC	VD	TF

The conditional termination altitude will be coded in columns 90 thru 94 of the SID record. If a "+", "-", or blank is entered in the Altitude Description field, entry of a second altitude will imply a conditional altitude termination. Conditional altitude termination is not allowed when a "B" is entered in the Altitude Description field.

J. Altitude terminations will not be used in descending procedures.

K. Lost communication procedures will be coded in place of vector legs if the procedure defines a complete route to the end of a SID or STAR.

L. Localizer facilities will not be used to define SID or STAR waypoints.

M. RHO and THETA for terminating fix on AF legs will be provided.

N. The turn and turn direction valid fields will be used to force a particular turn direction whenever the track/heading change exceeds 135°.

SID CODING RULES

A. If on take off, there is a turn greater than 15° without an altitude specified before the turn, a course from or a heading to an altitude (FA or VA) leg will be coded before the turn using runway heading for the VA leg terminating at 400 ft above the airport elevation. This altitude may vary with local controlling agency requirements.

B. If a SID ends in vectors to a fix, a VM leg followed by a CF or DF leg to that fix will be used. The heading for the VM leg (if any) will be based on the source document.

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ATTACHMENT 5 (cont'd)

PATH AND TERMINATOR GENERAL RULES

OBSOLETE - DO NOT USE

PT	W/P IDENT	OVER FLY	MISSED APPR	HOLDING	TURN DR	TURN DR VLD	RECD VHF	THETA	RHO	OB MAG CRS	DIST/TIME	ALT 1	ALT 2	SPEED LIMIT	VERT ANGLE	COMMENTS
AF	X	O			X		X	X	X	R		O	O	O		OB MAG CRS IS BOUNDARY RADIAL, THETA IS FIX RADIAL
CF	X	O	O		O	O	X	X	X	C	D	O	O	O	O	OB MAG CRS IS CRS TO SPECIFIED FIX
CI	X	O			O	O	X	X	X	C	D	O		O		OPTIONAL ALT WILL BE "AT" IF SUPPLIED
DF	X	O			O	O	O	O	O			O	O	O		
FA	X		O		O	O	X	X	X	C		+		O		ALT TERMINATION WILL BE "AT OR ABOVE"
FC	X	O	O		O	O	X	X	X	C	D	O	O	O		
FD	X	O	O		O	O	X	X	X	C	D	O	O	O		
FM	X		O		O	O	X	X	X	C		O		O		
HA	X			X	O		O	O	O	O	X	+		O		...ATION WILL BE "AT OR ABOVE"
HF	X			X	O		O	O	O	C	X	O		O		
HM	X			X	O		O	O	O	O	X	O		O		
IF	X						O	O	O			O	O			
PI	X				X		X	X	X	C	D	X		O		DIST IS FROM SPECIFIE... TO OUTER BOUNDARY OF TURN
TF	X	O			O	O	O	O	O	C	D	O	O	O	O	
TI	X	O			O	O				O		O		O		OPTIONAL ALT WILL BE "AT" IF SUPPLIED
VA			O		O	O				H		+		O		ALT TERMINATION WILL BE "AT OR ABOVE"
VD			O		O	O	X			H	D	O	O	O		
VI		O	O		O	O				H		O	O	O		
VM			O		O	O				H		O		O		
VR		O	O		O	O	X	X		H		O	O	O		

LEGEND:

X = REQUIRED
O = OPTIONAL
R = BOUNDARY RADIAL
C = COURSE
H = HEADING
D = DISTANCE
\+ = "AT OR ABOVE" ONLY
SHADED = NOT APPLICABLE

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Leg Data Fields
Table 3

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ATTACHMENT 5 (cont'd)

STAR CODING RULES

A. If a STAR ends in vectors to final approach (VM leg), the airport reference point will be coded in the WAYPOINT IDENT field.

B. If a STAR or Profile Descent does not begin at a fix, the closest named fix along the STAR/Profile Descent track will be assigned as the initial fix (IF) for the procedure.

C. If no crossing altitudes are specified on intermediate fixes of a STAR/Profile Descent, a vertical angle will be assigned to the last fix. This angle will be computed based on the altitude specified at the end fixes to provide a constant descent path through all fixes. The angle provided will ensure compliance with minimum enroute altitudes for those segments without assigned altitudes.

APPROACHES AND APPROACH TRANSITIONS

A. Semi-precision approaches

1. Approaches with circle to land minimums only will not be coded.

2. When a holding pattern used as course reversal or a procedure turn is part of an approach, it will be included in a transition.

3. If a runway transition is common to more than one approach, it will be coded each time with the IDENT corresponding to the approach IDENT.

4. Approach step down fixes will not be coded if a single CF leg to the runway waypoint with a vertical angle will satisfy intermediate altitude requirements. Minimum descent angle is 3 degrees when not specified by source document.

5. The CF leg is the preferred leg type for approaches.

6. The recommended VHF Navaid will be the same for all approach legs (missed approach legs not included).

7. Runway waypoint altitude will be 50 ft above the threshold unless otherwise specified by the controlling agency.

8. Transitions which are wholly contained in another transition will not be coded separately.

B. Precision approaches

1. ILS procedures will consist of Final Approach Course Fix (FACF), FAF, runway fix, and missed approach. The FACF is a fix located on the localizer beam center 8 NM or less from the outer marker. The FACF is coded as an IF leg with an altitude assigned based on the source document or equal to the altitude of the procedure turn or the altitude of the last transition leg.

ATTACHMENT 5 (cont'd)

APPROACHES AND APPROACH TRANSITIONS

2. Recommended VHF for ILS approach will be the appropriate localizer. RHO and THETA will be provided for each leg to the runway fix.

3. ILS approaches will use an initial fix (IF leg) at the FACF followed by CG legs to the runway fix.

4. The altitude for the last leg of an ILS approach will be the glideslope intercept altitude.

5. The recommended VHF for the last CF leg of an ILS transition will be the localizer.

C. Approach transitions for ILS approaches will be as follows:

1. Last leg in approach transition will

   a. Course to FACF (CF leg).

   b. Heading to intercept (VI

   c. Procedure turn (PI le

2. If case 1.a. above (CF le en:

   a. The last leg fix RE MD VHF will be localizer identifier.

   b. The CF leg length will be 8 miles or less and within the reception range of the localizer. If the last transition fix is more than 8 miles from the FACF, a combination of an FC and CF leg will be used with the CF leg length less than or equal to 4 miles. (See Figure 1.)

   c. The approach course intercept angle will be 30 degrees or less.

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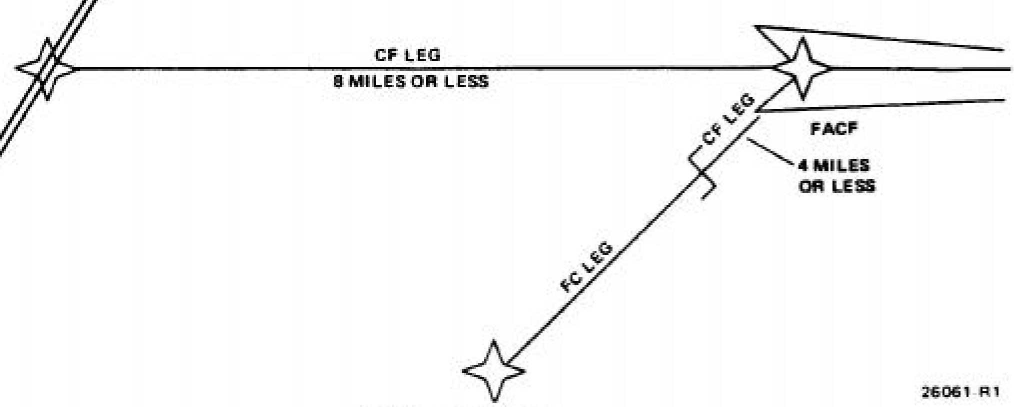

ILS Transitions
Figure 1

ATTACHMENT 5 (cont'd)

APPROACHES AND APPROACH TRANSITIONS

3. If case 1.b. above (VI leg), then:

    a. Heading will intercept ILS approach course between FACF and FAF.

    b. Intercept angle will be 30 degrees or less or per source document, and no less than 2 miles from FAF.

D. Missed Approaches

1. Missed approaches will be coded as part of each approach. The first missed approach record will contain an "M" in column 42 of the DESC CODE field.

2. The first leg of the missed approa[illegible]ill contain an altitude to command a climb. If a turn in excess of 15° fr[illegible]unway heading is required, then a VA or FA leg on the runway heading to [illegible] above the airport elevation will be the first leg of the missed approach [illegible]wed by the required turn.

3. Opposite end runway fixes wi[illegible] be used on missed approaches.

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AERONAUTICAL RADIO, INC.
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SUPPLEMENT 3

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: January 17, 1983

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: November 4, 1982

A. PURPOSE OF THIS SUPPLEMENT

This Supplement restructures the format of the company route record, adds guidance on coding VOR approaches in Attachment 5 and corrects previously undiscovered editorial and typographical errors. Additionally, it introduces a small number of clarifying amendments into the Specification.

B. ORGANIZATION OF THIS SUPPLEMENT

The first part of this document, printed on goldenrod paper, contains descriptions of the changes introduced into the Specification by this Supplement, and where appropriate, extracts from the original text for comparison purposes. The second part consists of replacement white pages for the Specification modified to reflect these changes. The modified and added material on each replacement page is identified with c-3 symbols in the margins.

Existing copies of Specification 424-2 may be updated by inserting the replacement white pages where necessary and destroying the pages they displace. The goldenrod pages should be inserted inside the rear cover of the Specification, following Supplement 2.

C. CHANGES TO ARINC SPECIFICATION 424 INTRODUCED BY THIS SUPPLEMENT

This Section presents a complete tabulation of the changes and additions to the Specification introduced by this Supplement. Each change or addition is identified using the section number and title currently employed or the section number and title that will be employed when the Supplement is eventually incorporated. In each case there is included a brief description of the addition or change.

2.2 Special Navigation Terms

The term "Off-Airway Floating Waypoint" changed to "Off-Route Floating Waypoint" because such waypoints may exist in terminal areas as well as in the enroute environment.

4.2.1 Primary Records (VHF NAVAIDS)

New field "DME Bias (2)" added in columns 86 and 87. "Reserved (Expansion) (8)" field in columns 86 through 98 changed to "Reserved (Expansion) (6)" columns 88 through 93. Reference to Section 5.90 added for "DME Bias (2)" field.

4.6.1 Primary Records Enroute Airways (ER)

"Blank (Spacing) (4)" field in columns 22 through 25 changed to "Blank (Spacing) (6)" in columns 20 through 25. "Route Type (1)" moved from column 20 to column 45. "Level (B) (L) (H) (I)" moved from column 21 to column 46.

4.9.1 Primary Records

"Inbound Magnetic Course (4)" field in columns 79 through 82 changed to "Blank (Spacing) (4)." Reference to Note 2 for "Altitude field in columns 90 through 94 deleted. Note 2 deleted.

ORIGINAL TEXT FOLLOWS

Note 2: The second altitude field (columns 90 through 94) will be filled only when the Altitude Descript field contains the entry "B." Section 5.20 of this document refers.

4.10.1 Primary Records

"Vertical Angle (4)" field in columns 78 through 81 changed to "Blank (Spacing) (4)" and reference to Section 5.70 deleted.

4.12 Company Route Records (R)

This section revised completely.

ORIGINAL TEXT FOLLOWS

4.12 Company Route Records (R)

This file contains company tailored route information.

4.12.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Reserved (Spacing) (1)	
7 thru 11	From Airport/Fix (5)	5.75
12 thru 13	ICAO Code (2)	5.14
14	File Code (1)	5.15
15 thru 19	To Airport/Fix (5)	5.75
20 thru 21	ICAO Code (2)	5.14
22	File Code (1)	5.15
23 thru 27	Company Route Identifier (5)	5.76
28 thru 31	Reserved (4)	Note 1
32 thru 36	Via Identifier (5)	5.77
37 thru 39	Sequence No. (3)	5.12
40 thru 123	Company Route Description (84)	5.78
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note 1: Although the Company Route Identifier field is five characters in length, some users envisage the need for nine characters in certain cases. These reserved columns will permit this usage.

ARINC STAFF NOTE: The foregoing changes in Chapter 4 necessitated revisions in Figure 4-1 in Specification 424-2.

5.3 Customer/Area Code

New sentence added to Source/Content paragraph to describe use of Area Code on Company Route records.

5.11 Transition Identifier (TRANS IDENT)

Each occurrence of "type 1" in Note 1 replaced with "type 1 or 4" and each occurrence of "type 2" replaced with "type 2 or 5." Note 3 added.

5.17 Waypoint Description Code (DESC CODE)

"Uncharted Airway Intersection +,." with corresponding "U" in column 41, and "Missed Approach Point ++," with corresponding “M” in column 43, added to table (iii). “+” and “++” notes added below table (iii).

5.24 Theta (THETA)

New final sentence added to “Definition/Description paragraph.

5.26 Outbound Magnetic Course (OB MAG CRS)

New final sentence added to “Definition/Description” paragraph.

5.27 Route Distance From, Holding Distance/Time

New material added to “Definition/Description” paragraph to describe use of “Route Distance From” in path terminator codes.

5.28 Inbound Magnetic Course (IB MAG CRS)

New final sentence added to Definition/Description” paragraph.

5.35 NAVAID Class (CLASS)

“Biased DME” added to VHF Navaid section of table (v) with corresponding “D” entry in column 31. “Longitude” changed to “longitudes” in second line of note.

5.42 Waypoint Type (TYPE)

“Unnamed Intersection” entry in table changed to “Unnamed, Charted Intersection,” “Speed Limit Point” and entry “S” in column 27 deleted, “Off-Airway Intersection” entry changed to “Off-Route Intersection” and “Uncharted Airway Intersection,” with “U” entry in column 27, added.

5.53 Transition Altitude (TRANS ALTITUDE)

“Definition/Description” paragraph revised completely. “18,000” deleted from examples.

ORIGINAL TEXT FOLLOWS

5.53 Transition Altitude (TRANS ALTITUDE)

Definition/Description: The “Transition Altitude” field defines the altitude at which the altimeter barometric setting is changed from 1012.25 mb (29.92 ins of mercury) to the local value for the airport identified in the record.

Source/Content: Transition altitudes are derived from official government sources.

Used On:	SID/STAR, Approach Route records
Length:	5 characters
Character Type:	Numeric
Examples:	18000, 05000, 23000

5.63 Turn (TURN)

“Source/Content” paragraph added.

5.66 Station Declination (STN DEC)

New final sentence added to “Source/Content” paragraph. “T000” and “G000” added to examples. Commentary added.

5.70 Vertical Angle (VERT ANGLE)

“Definition/Description” and “Source/Content” paragraphs revised completely. “Runway records” deleted from “Used on” list and “360” from examples. Note deleted.

ORIGINAL TEXT FOLLOWS

5.70 Vertical Angle (VERT ANGLE)

Definition/Description: “Vertical Angle” will be specified on the runway waypoint of approaches. The angle should cause the aircraft to fly level, then descend. A 0° vertical angle should cause the aircraft to descend and then fly level. On runway records, the vertical angle is used to define the glideslope angle for the ILS defined in the LOC IDENT field.

Source/Content: Values from official government sources will be used when available. On runway records thru range is –2.00° through –4.00° inclusive. On approach records the range is 0.00° and –2.00° through –4.00° except for the runway waypoint where the range is –2.00° through -4.00°. For semi-precision approaches the vertical angle may be computed from the FAF altitude constraint to 50 feet above the runway threshold using a minimum value of –3.00°.

Used On:	Approach Routes records, STAR records, Runway records
Length:	4 characters
Character Type:	Numeric
Examples:	-250, -300, 360

Note: Vertical angle will be included in runway records only when runway has published straight-in landing minimums.

ARINC STAFF NOTE: Vertical Angle limits also changed from “2.00° thru 4.00°” to “–3.00° to –3.77°” on Figure 5-5.

5.76 Company Route Ident

Length changed from 5 characters to 10 characters. Note explaining provisions for extension from 5 characters to 9 characters deleted.

5.77 Via Identifier (VIA IDENT)

Section revised completely.

ORIGINAL TEXT FOLLOWS

5.77 Via Identifier (VIA IDENT)

Definition/Description: The “Via Identifier” field, is used to further define the company route.

5.77 Via Identifier (VIA IDENT) (cont'd)

Source/Content: This field is determined by the customer.

Used On: Company Route records
Length: 5 characters
Character Type: Alpha/Numeric

5.78 SID/STAR/App/Awy

Section renamed and revised completely.

ORIGINAL TEXT FOLLOWS

5.78 Company Route Description

Definition/Description: The "Company Route Description" field is a flight plan type route description of airways and fixes from point of origin to destination. SIDs, STARs, and Runway information may also be included.

Source/Content: This field is determined by the customer, and each route may contain more than one record. (See Figure 5-6).

Used On: Company Route Records
Length: 84 characters
Character Type: Alpha/Numeric

5.83 To Fix

New section added by this Supplement.

5.84 Runway Transition

New section added by this Supplement.

5.85 Enroute Transition

New section added by this Supplement.

5.86 Cruise Altitude

New section added by this Supplement.

5.87 Terminal/Alternate Airport

New section added by this Supplement.

5.88 Alternate Distance

New section added by this Supplement.

5.89 Cost Index

New section added by this Supplement.

5.90 DME Bias

New section added by this Supplement.

Figure 5-6 - Company Route Record Example

Figure revised completely. See page 5 of this Supplement for the original (now obsolete) figure.

Attachment 2 - Waypoint Identifiers

E. Duplicate Identifiers

Words "or letter" added to end of first sentence. Example "SHAWNEE (FLA)" changed to "SHAWNEE (CAL)." Following examples added:

CPR 29 CPR 29A
CPR 29 CPR 29B

F. Terminal Waypoints

1. Airport-Related Waypoints

Prefix "CF Final Approach Course Fix" added to list.

3. Bearing/Distance Waypoints

Title changed (was "DME Arc Waypoints") and subsection "d" added.

Attachment 3 – Navigation Chart/File Data Relationship

Pages 50 through 59 re-ordered to present file data in record order.

Attachment 5 – Path and Terminator

General Rule B:	"IF (route type 2 or 5 only)" added to "Ending Leg" list for SID/STAR Runway Transition procedure. Note following VI Ending Leg descriptor for Approach Transition procedure expanded from "(LOC only)."
Table I:	"+" added at CF row/DF column intersection on diagram. "+" note added below diagram and "+" note revised. (Original Words: Sequence permitted only if altitude of IF leg is different than leg termination altitude.)
General Rule G:	Second and third sentences added.
General Rule I:	Second paragraph added.
General Rule N:	Revised completely. (Original Words: The turn and turn direction valid fields will be used to force a particular turn direction whenever the track/heading change exceeds 135°. These two fields are used together to indicate that a turn in the specified direction must be executed prior to intercepting the path defined in the record.
Table 3:	Path Length designator "P" added to legend. "P" substituted for "D" in DIST/TIME column of table at CF, CI, FC and PI row intersections.
General Rule AA:	New material added by this Supplement.
General Rule BB:	New material added by this Supplement.
STAR Coding Rule E:	Route types "2 or 5" added.
Approaches and Approach Transitions:	This section extensively revised. See pages 5-7 of this Supplement for the original (now obsolete) material.

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ATTACHMENT 5 (cont)

PATH AND TERMINATOR

APPROACHES AND APPROACH TRANSITIONS

A. General

All approach altitudes between the FACF and the runway inclusive will be coded as "AT".

B. Semi-precision approaches

1. Approaches with circle-to-land minimums only will not be coded.

2. When a holding pattern used for course reversal or a procedure turn is part of an approach, it will be included in a transition.

3. If a runway transition is common to more than one approach, it will be coded each time with the IDENT corresponding to the approach IDENT.

4. Approach step-down fixes will not be coded if a single CF leg to the runway waypoint with a vertical angle will satisfy intermediate altitude requirements. Minimum descent angle is 3° when not specified by source document.

5. The CF leg is the preferred leg type for approaches.

6. The recommended VHF Navaid will be the same for all approach legs (missed approach legs not included).

7. Runway waypoint altitude will be 50 feet above the threshold unless otherwise specified by the controlling agency.

8. Transitions which are wholly contained in another transition will not be coded separately.

C. Precision approaches

1. ILS procedures will consist of Final Approach Course Fix (FACF), FAF, runway fix, and missed approach. The FACF is a fix located on the localizer beam center 8 NM or less from the outer marker or within reception range of the localizer. The FACF is coded as an IF leg with an altitude assigned, based on the source document or equal to the altitude of the procedure turn or the altitude of the last transition leg.

2. Recommended VHF for ILS approach will be the appropriate localizer. RNO and THETA will be provided for each leg to the runway fix.

3. ILS approaches will use an initial fix (IF leg) at the FACF, followed by CF legs to the runway fix.

													(SID – NO TRANS. STAR AND TRANS)		
T	IP	R		ESFO	E2	P	EDFW	E4	P	01001	BCE	001	<LNDN5 (RW28B), MELTS + E2/USA/... SONNY + E2. 302. MYA + E1. BCE + E2 @ FL 370. [50, SPS + E4> BOHDS 4-5	13346	7912
T	IP	R		ESFO	E2	P	EDFW	E4	P	01001	BCE	002	PB (RW17R) "KIAH + E4" *	13346	7912
													(ROUTE FOR ALTERNATE AIRPORT ABOVE)		
T	IP	R		EDFW	E4	P	KIAH	E4	P	02001	BILEE	001	/USA/.. DFW + E4. [87. BILEE + E4> CUGAR 1 – BILEE (ALL)*	12960	8003
													(SID AND TRANS. NO STAR)		
T	IP	R		ESFO	E2	P	CYYC	CY	P	C048	RBL	001	< RCD 3 – RBL (RW01B), RBL + E2 @ FL 350/USA/. [1, SEA + E1. [500, ONSET + E1/CAN/. HL500, YYC + CY*	13346	7912
													(NO SID (VECTOR) AND TRANS. NO STAR. ENDS AT NAVAID)		
T	IP	R		EPHX	E2		MCB	E2	D	C51	GBN	001	< MOBIE 3 – GBN (RW26B), GBN + E2/USA/. [1, MCB + E2 @ FL 390*	14235	7912
													(GREAT CIRCLE ROUTE WITH SID AND STAR)		
T	IP	R		ESFO	E2	P	EMIA	E7	P	GC1		001	< PORTE 2 – FAT (ALL), FAT + E2/USA/... 01 HEC + E2 @ FL 390 ... 05BEC + E2 ... 44PHX + E2 ... 30W85 + E2 ... LVS	15034	7912
T	IP	R		ESFO	E2	P	EMIA	E7	P	GC1		002	84 + E2 ... AMA + E4 ... SPS65 + E4 ... SLN76 + E4 ... LCH 32 + E4 ... LEV45 + E7 ... 38CEW + E7 ... SRQ + E7 LEILA1 –	15033	7912
T	IP	R		ESFO	E2	P	EMIA	E7	P	GC1		003	SRQ*	15336	7912
													(RNAV WITH NO SID OR STAR. ENDS AT A WAYPOINT)		
T	IP	R		EDEN	E2	P	REBOP	E2	E	AIR	[MKR	001	/USA/ ... BLAND + E2 ... [MKR, OAL + E2 @ FL 350, [684R, REBOP + E2*	16235	8001

LEGEND

.	Via Airway	/ /	Area Coverage
..	Via Direct VHF NAVAID	*	End of Route
...	Via Direct Waypoint	–	SID & STAR Separator from Transition
<	Via SID	+	Ident & ICAO Separator
>	Via STAR	@	At Altitude
( )	Runway	" "	Alternate Airport
,	To (Separator)		

OBSOLETE

DO NOT USE

Figure 5-6
COMPANY ROUTE RECORD (B) EXAMPLE

OBSOLETE
DO NOT USE

ATTACHMENT 5 (cont)

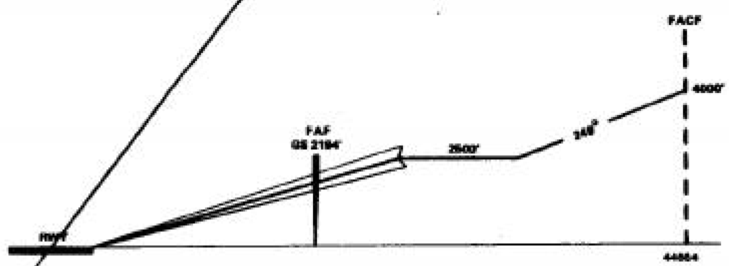
PATH AND TERMINATOR

APPROACHES AND APPROACH TRANSITIONS

C. 4. The altitude for the last leg of an ILS approach will be assigned according to the FAF rules in paragraph C.6.

5. The recommended VHF for the last CF or VI leg of an ILS transition will be the localizer.

6. ILS Glideslope captures are classified into three types: A, B, and C. In type A (Figure 1) descent is authorized immediately after passing the FACF to a level intercept segment which terminates at or near the FAF. To code this approach, the FACF crossing altitude will be coded as AT 4000'. The glideslope intercept altitude of 2500' will be coded in altitude 1 on the FAF record. The glideslope altitude at the FAF, 2194', will be entered in altitude 2 with the altitude description field containing a "G". The vertical angle of -0.00° will be coded on the FAF record to indicate that descent to the intercept altitude is authorized immediately after passing the FACF. The GS intercept altitude (2500') will be coded in ALT 2 of the FACF record with an ALT DESC of "I".



Type A Descent
Figure 1

OBSOLETE
DO NOT USE

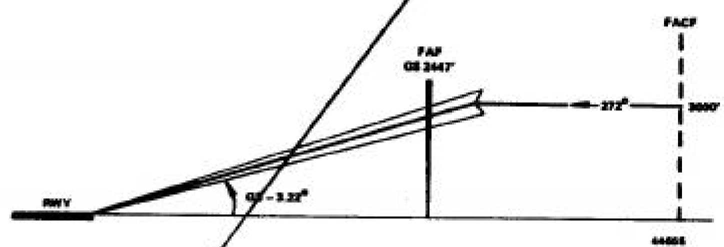
ATTACHMENT 5 (cont)

PATH AND TERMINATOR

APPROACHES AND APPROACH TRANSITIONS

C. 6. (cont)

In Type B (Figure 2), descent below the FACF crossing altitude is not authorized until interception of the glideslope or its extension. In this case the FACF record will contain AT 3000' as the altitude constraint in ALT 1 and 3000' in ALT 2 with an "I" in the ALT DESC field. The FAF record will contain the glideslope altitude at the FAF in altitude 1 (AT 2447') and the glideslope angle (-3.22°) in the vertical angle field. This coding will cause the aircraft to fly level at 3000' until intercepting the vertical angle.

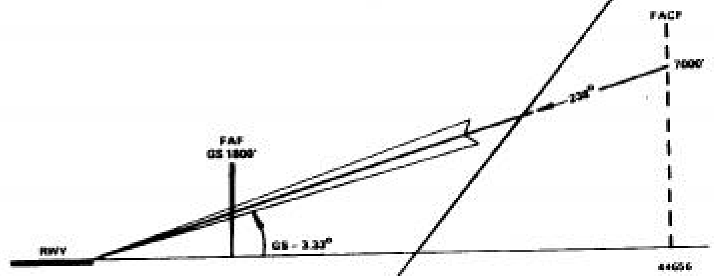


Type B Descent
Figure 2

The Type C descent is illustrated in Figure 3. In this case the FACF is the first point on a constant descent path. The approach is coded with the FACF crossing altitude of AT 7000' in ALT 1 and 7000' in ALT 2 with an "I" in the ALT DESC field. The FAF record will contain the GS altitude at the FAF (1800') and the GS angle of -3.33° will be coded in the vertical angle field as "D3.33". The "D" indicates that a constant descent path is to be flown between the FACF and the FAF.

OBSOLETE
DO NOT USE

APPROACHES AND APPROACH TRANSITIONS



Type C Descent
Figure 3

C. 7. The OB MAG CRS field will contain the localizer bearing rounded to the nearest whole degree to concur with the official source document course when the course is nominally the final approach course.

D. Approach transitions for ILS approaches will be as follows:

1. Last leg in approach transition will be:

   a. Course to FACF (CF leg).

   b. Heading to intercept (VI leg).

   c. Procedure turn (PI leg).

2. If case 1.a. above (CF leg), then:

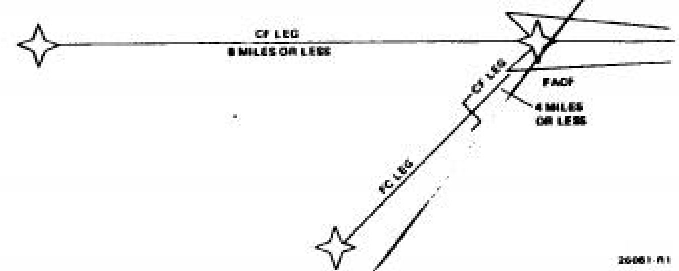
   a. The last leg fix RECMD VHF will be localizer identifier.

   b. The CF leg length will be 8 miles or less or within the reception range of the localizer. If the last transition fix is more than 8 miles from the FACF, a combination of an FC and CF leg will be used with the CF leg length less than or equal to 4 miles. (See Figure 4.)

   c. The approach course intercept angle will be 30° or less.

OBSOLETE
DO NOT USE

APPROACHES AND APPROACH TRANSITIONS



ILS Transitions
Figure 4

D. 3. If case 1.b. above (VI leg), then:

   a. Heading will intercept ILS approach course between FACF and FAF.

   b. Intercept angle will be 30° or less or per source document, and no less than 2 miles from FAF.

   c. The VI leg will contain the localizer ident in the recommended VHF field.

E. Missed Approaches

1. Missed approaches will be coded as part of each approach. The first missed approach record will contain an "M" in column 42 of the DESC CODE field.

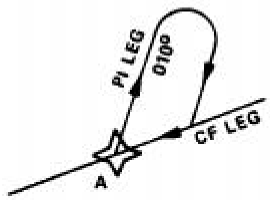
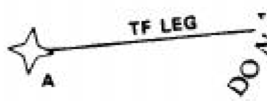
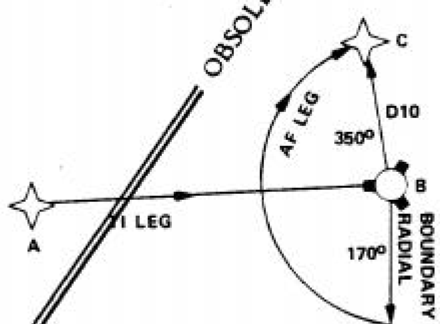
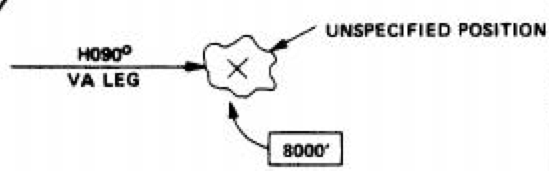
2. The first leg of the missed approach will contain an altitude to command a climb. If a turn in excess of 15° from runway heading is required, then a VA or FA leg on the runway heading to 400 feet above the airport elevation will be the first leg of the missed approach followed by the required turn.

3. Opposite end runway fixes will not be used on missed approaches.

ATTACHMENT 5 (cont'd)

PATH AND TERMINATOR
GENERAL RULES

OBSOLETE - DO NOT USE

Leg(s)	Example	Description
PI-CF		Procedure turn (PI) followed by a course to a fix (CF)
TF		Track between two fixes (great circle)
TI-AF		Track to a next leg (TI) followed by a constant DME arc to a fix (AF). Waypoint is not required at intersection of TI and AF leg.
VA		Heading to an altitude (position unspecified)

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Leg Type Illustrations
Table 2 (cont)

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SUPPLEMENT 4

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: November 10, 1983

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: October 12, 1983

A. PURPOSE OF THIS SUPPLEMENT

This Supplement extends the scope of Specification 424 to cover the navigation data base needs of airline flight simulators and introduces a number of corrections for typographical and other minor errors.

B. ORGANIZATION OF THIS SUPPLEMENT

The first part of this document, printed on goldenrod paper, contains descriptions of the changes introduced into the Specification by this Supplement, and where appropriate, extracts from the original text for comparison purposes. The second part consists of replacement white pages for the Specification modified to reflect these changes. The modified and added material on each replacement page is identified with c-4 symbols in the margins.

Existing copies of Specification 424-3 may be updated by inserting the replacement white pages where necessary and destroying the pages they displace. The goldenrod pages should be inserted inside the rear cover of the Specification, following Supplement 3.

C. CHANGES TO ARINC SPECIFICATION 424 INTRODUCED BY THIS SUPPLEMENT

This Section presents a complete tabulation of the changes and additions to the Specification introduced by this Supplement. Each change or addition is identified using the section number and title currently employed or the section number and title that will be employed when the Supplement is eventually incorporated. In each case there is included a brief description of the addition or change.

1.1.1 Coverage of Flight Simulator Needs

New section added by this Supplement.

3.2.14 Airport Section (P) – ILS Markers Subsection (PM)

New section added by this Supplement.

3.2.15 Airport Section (P) – Airport Communication Subsection (PV)

New section added by this Supplement.

3.2.16 Enroute Section (E) – Airways Marker Subsection (EM)

New section added by this Supplement.

4.2.1 Primary Records

Columns 86 through 87 – field name changed from “DME Bias” to “ILS/DME Bias.”

4.2.2 Continuation Records

Column 23 – reassigned from “Notes” to “Reserved (Spacing).” Subsequent “Notes” field reduced in length by one character. Note added below table describing reason of column 23 reservation.

4.2.3 Simulation Continuation Records

New section added by this Supplement.

4.3.1 Primary Records

Columns 75 through 79 – field name changed from “Station Declination” to “Magnetic Variation” and reference changed from 5.66 to 5.39.

4.3.2 Continuation Records

Identical change to that described above for Section 4.2.2.

4.3.3 Simulation Continuation Records

New section added by this Supplement.

4.5.2 Continuation Records

Column 40 – reassigned from “Notes” to “Reserved (Spacing).” Subsequent “Notes” field reduced in length by one character. Note added below table describing reason for Column 40 reservation.

4.6.2 Continuation Records

Identical change to that described above for Section 4.5.2.

4.7.1 Primary Records

Columns 14 through 16 – reassigned from “Blank (Spacing)” to “ATA/IATA Designator” and 5.107 reference added. Columns 17 through 18 – reassigned from “Blank (Spacing)” to “Reserved (Expansion).” Column 30 – reassigned from “Blank (Spacing)” to “IFR Capability” and 5.108 reference added.

4.7.2 Continuation Records

Identical change to that described above for Section 4.2.2.

4.8.2 Continuation Records

Identical change to that described above for Section 4.2.2.

4.9.2 Continuation Records

Identical change to that described above for Section 4.5.2.

4.10.1 Primary Records

Columns 52 through 59 – reassigned from “Reserved (Electronic Chart System Use)” to “Blank (Spacing).” Columns 61 through 66 – reassigned from “Reserved (Electronic Chart System Use)” to “blank (Spacing).” Columns 78 through 80 – reassigned from “Blank (Spacing)” to “Runway Width” and 5.109 reference added.

4.10.2 Continuation Records

Identical change to that described above for Section 4.2.2.

4.10.3 Simulation Continuation Records

New section added by this Supplement.

4.11.2 Continuation Records

Identical change to that described above for Section 4.2.2.

4.11.3 Simulation Continuation Records

New section added by this Supplement.

4.13 ILS Marker (PM)

New section added by this Supplement.

4.13.1 Primary Records

New section added by this Supplement.

4.14 Airport Communication Records (PV)

New section added by this Supplement.

4.14.1 Primary Records

New section added by this Supplement.

4.14.2 First Simulation Continuation Record

New section added by this Supplement.

4.14.3 Additional Continuation Records

New section added by this Supplement.

4.15.1 Primary Records

New section added by this Supplement.

ARINC STAFF NOTE: The foregoing changes in Chapter 4 necessitated revisions to Figure 4-1 in Specification 424-3.

5.5 Subsection Code (SUB CODE)

Subsection code "M-Airways Markers" added in Section Code "E" part of Table (i). Subsection codes "M-ILS Markers" and "V-Airport Communications" added in Section Code "P" of Table (i).

5.6 Airport Identifier (ARPT IDENT)

Text amended and rearranged for improved clarity.

ORIGINAL TEXT FOLLOWS

5.6 Airport ICAO Identifier (ARPT IDENT)

Definition/Description: The "Airport ICAO Identifier" field contains the ICAO identification code of the airport to which the data contained in the record relates.

Note: ICAO airport identifier codes differ from the perhaps more familiar ATA/IATA airport designators. ATA/IATA codes are not employed in this field.

Source/Content: The content of this field should be derived from ICAO Document No. 7910, "Location Indicators."

Used On: SID/STAR, Approach Route, ILS, Airport, Gate, Runway and Terminal Waypoint (PC) records
Length: 4 characters
Character Type: Alpha/numeric
Examples: KJFK, KMIA, 9V9, CYUL, EDDF

5.26 Outbound Magnetic Course (OB MAG CRS)

Character type changed from "Numeric" to "Alpha/Numeric." Example "194T" added.

5.28 Inbound Magnetic Course (IB MAG CRS)

SID/STAR and Approach Route records deleted from "Used On" list. Character type changed from "Numeric" to "Alpha/Numeric." Example "194T" added.

5.32 Cycle Date (CYCLE)

"Definition/Description" amended to exclude changes in continuation record number and file record numbers from requiring a cycle data change.

ORIGINAL TEXT FOLLOWS

Definition/Description: The "Cycle Date" field identifies the calendar period in which the record was added to the file or last revised. A change in any ARINC 424 field requires a cycle date change. The cycle date will not change if there is no change in the data.

5.34 VOR/NDB Identifier (VOR IDEINT/NDB IDENT)

ILS Marker records added to the "Used On" list.

5.35 NAVAID Class (CLASS)

Table (v) revised to add class of locators at markers and an indicator in column 32 for non-collocated facilities. "Biased DME" facility type changed to "Biased ILS/DME."

5.36 Latitude (LATITUDE)

ILS Marker, Airways Marker and Airport Communications records added to "Used On" list.

5.37 Longitude (LONGITUDE)

ILS Marker, Airways Marker and Airport Communications records added to "Used On" list.

5.39 Magnetic Variation (MAG VAR)

"Used On" list changed from Airport and NDB NAVAID records."

5.46 Runway Identifier (RUNWAY IDENT)

ILS Marker records added to "Used On" list.

5.71 Name Field

Enroute Marker records added to "Used On" list.

5.77 VIA

Note added describing the purpose of Figure 5-6.

5.80 ILS Category (CAT)

"Source/Content" paragraph expanded to describe use of 0 in this field.

5.90 ILS DME Bias

Section title changed from "DME Bias." No other changes.

5.91 Continuation Record Application Type (APPL)

New section added by this Supplement.

5.92 Facility Elevation (FAC ELEV)

New section added by this Supplement.

5.93 Facility Characteristics (FAC CHAR)

New section added by this Supplement.

5.94 True Bearing (TRUE BRG)

New section added by this Supplement.

5.95 Government Source (SOURCE)

New section added by this Supplement.

5.96 Glide Slope Beam Width (GS BEAM WIDTH)

New section added by this Supplement.

5.97 Touchdown Zone Elevation (TDZE)

New section added by this Supplement.

5.98 TDZE Location (LOCATION)

New section added by this Supplement.

5.99 Marker Type (MKR TYPE)

New section added by this Supplement.

5.100 Minor Axis (MINOR AXIS)

New section added by this Supplement.

5.101 Communication Type

New section added by this Supplement.

5.102 Radar (RADAR)

New section added by this Supplement.

5.103 Communications Frequency (COMM FREQ)

New section added by this Supplement.

5.104 Modulation (MODLN)

New section added by this Supplement.

5.105 Call Sign (CALL SIGN)

New section added by this Supplement.

5.106 Additional Service (ADDL SERVICE)

New section added by this Supplement.

5.107 ATA/IATA Designator (ATA/IATA)

New section added by this Supplement.

5.108 IFR Capability (IFR)

New section added by this Supplement.

5.109 Runway Width (WIDTH)

New section added by this Supplement.

5.110 Marker Ident (MARKER IDENT)

New section added by this Supplement.

5.111 Marker Code (MARKER CODE)

New section added by this Supplement.

5.112 Marker Shape (SHAPE)

New section added by this Supplement.

5.113 High/Low (HIGH/LOW)

New section added by this Supplement.

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SUPPLEMENT 5

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: March 18, 1985

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: October 10, 1984

A. PURPOSE OF THIS SUPPLEMENT

This Supplement extends the scope of Specification 424 to cover the navigation data base needs of automated flight planning and introduces a number of corrections for typographical and other minor errors.

B. ORGANIZATION OF THIS SUPPLEMENT

The first part of this document, printed on goldenrod paper, contains descriptions of the changes introduced into the Specification by this Supplement, and where appropriate, extracts from the original text for comparison purposes. The second part consists of replacement white pages for the Specification modified to reflect these changes. The modified and added material on each replacement page is identified with c-5 symbols in the margins.

Existing copies of Specification 424-4 may be updated by inserting the replacement white pages where necessary and destroying the pages they displace. The goldenrod pages should be inserted inside the rear cover of the Specification, following Supplement 4.

C. CHANGES TO ARINC SPECIFICATION 424 INTRODUCED BY THIS SUPPLEMENT

This Section presents a complete tabulation of the changes and additions to the Specification introduced by this Supplement. Each change or addition is identified using the section number and title currently employed or the section number and title that will be employed when the Supplement is eventually incorporated. In each case there is included a brief description of the addition or change.

2.2 Special Navigation Terms

The definition of ATC Compulsory Reporting Point is changed, and two new definitions are added.

ORIGINAL TEXT FOLLOWS

ATC Compulsory Reporting Point	A waypoint which normally would be classified as nonessential might be a waypoint at which ATC requires the pilot to make a communications report. Waypoints falling into this category are classified as ATC Compulsory Reporting Points.

3.2 Master Airline User File Content

The paragraphs in this section are renumbered to reflect the hierarchical structure of the master data file.

4.2 VHF NAVAID Record

The wording of the last sentence of the paragraph is changed to clarify the handling of duplicate VOR and TACAN idents.

ORIGINAL TEXT FOLLOWS

For non-frequency paired VOR and TACAN stations having the same identifier, the TACAN is stored unless the VOR is used for enroute airways.

4.2.1 Primary Records VHF NAVAIDS

Columns 6 through 13 reassigned from "Blank (Spacing)." "Reserved" status removed from column 85 assignments and Note 1 deleted. Columns 88 through 93 reassigned from "Reserved (Expansion)."

ORIGINAL TEXT FOLLOWS

Note 1: "NAVAID Figure of Merit No." has no navigation function. Should official approval be forthcoming; however, for the use of NAVAID's beyond ranges specified in the class field, this field could indicate the limitations of such use.

4.2.4 Flight Planning Continuation Records

This section is added.

4.2.5 Flight Planning Continuation Records

This section is added.

4.3.1 Primary Records

Length "(l)" is added to Column 6 Subsection Code.

4.3.4 Flight Planning Continuation Records

This section is added.

4.3.5 Flight Planning Continuation Records

This section is added.

4.4 Waypoint Records (EA OR PC)

A sentence has been added to clarify why waypoints are stored in the EA section.

4.4.1 Primary Records

Column 19 reassigned from "Reserved (6^{th} Char. W.P.)" and columns 52 through 98 reassigned from "Reserved (Expansion)." Length "(2)" is added to columns 30 and 31. Note 3 is deleted.

ORIGINAL TEXT FOLLOWS

Note 3: The standard length for the waypoint identifier field is 5 characters. Some users envisage the need for 6 characters in certain cases. This reserved column will permit this usage.

4.4.3 Flight Planning Continuation Records

This section is added.

4.4.4 Flight Planning Continuation Records

This section is added.

4.5.1 Primary Records

Columns 27 through 29 reassigned from "Blank (Spacing)" and columns 30 through 35 reassigned from "Waypoint Identifier" (30-34) and "Reserved (6^{th} Char. of Waypoint Ident) (35)." Note 1 deleted.

ORIGINAL TEXT FOLLOWS

Note 1: The standard length of the Waypoint Identifier field is five characters. Some users envisage the need for a six-character field in certain cases. This revision column will permit this usage.

4.6 Enroute Airways Records (ER)

The last sentence in this section is deleted.

ORIGINAL TEXT FOLLOWS

4.6 Enroute Airways Records (ER)

The Enroute Airways file will contain the sequential listing of airways by geographic areas. This file may also contain enroute off-airway waypoints by geographic area, without sequence numbers of airway idents.

4.6.1 Primary Records (ER)

Column 35 reassigned from "Reserved" and Note 1 revised. Columns 46 through 49 reassigned from "Blank (Spacing)." Columns 84 through 85 reassigned from "Altitude" and Columns 89 through 123 reassigned from "Reserved (Expansion)."

ORIGINAL TEXT FOLLOWS

Note 1: The standard lengths for the Route Identifier and the Waypoint Identifier fields are each five characters. Some users envisage the need for six-character fields in certain instances. These reserved columns will permit this usage.

4.7.1 Primary Records

Columns 28 through 32 reassigned from "Airport Class" (28-29) "IFR Capability" (30) and "Blank (Spacing)" (31-32). Columns 65 through 70 reassigned from "Reserved (Expansion)."

4.7.3 Flight Planning Continuation Records

This section is added.

4.7.4 Flight Planning Continuation Records

This section is added.

4.9.1 Primary Records

Columns 21 through 25 reassigned from "Transition/RWY No. or Blank." Columns 26 and 35 reassigned from "Blank (Reserved)." Note 1 revised.

ORIGINAL TEXT FOLLOWS

Note 1: The Transition Identifier and the Waypoint Identifier fields are five characters each. Some users envisage the need for six-character fields in certain cases. These reserved columns will permit this usage.

4.9.3 Flight Planning Continuation Records

This section is added.

4.9.4 Flight Planning Continuation Records

This section is added.

4.11 ILS (Localizer and Glide Slope) Records

This section is revised to permit blank fields in the glide slope information fields when the data for them is not available.

4.11.1 Primary Records

Length of "(1)" is added to fields 1 and 6.

4.12.1 Primary Records

Columns 6 through 12 reassigned from "Reserved (Spacing)" (16) and "From Airport/Fix" (7-12). Column 22 reassigned from "To Airport./Fix." Columns 91 through 94 reassigned from "Reserved (Expansion)."

4.13.1 Primary Records

The field name and length for columns 14 through 17 is added (previously "Blank (Spacing))."

4.16 Cruising Tables Records (TC)

This section is added.

4.16.1 Primary Records

This section is added.

4.17 FIR/UIR Records (UF)

This section is added.

4.17.1 Primary Records

This section is added.

4.18 Restrictive Airspace Records (UR)

This section is added.

4.18.1 Primary Records

This section is added.

4.18.2 Continuation Records

This section is added.

4.19 Grid MORA Records (AS)

This section is added.

4.19.1 Primary Records

This section is added.

4.20 MSA (Minimum Safe Altitude Records) (PS)

This section is added.

4.20.1 Primary Records

This section is added.

4.20.1 Primary Records (cont'd)

ARINC STAFF NOTE: The foregoing changes in Chapter 4 necessitated revisions to Figure 4-1 in Specification 424-5.

5.3 Customer/Area Code (CUST/AREA)

"Examples" are changed.

5.5 Subsection Code (SUB CODE)

"Used On" has been revised to read "All records." New sections are added to the chart.

Figure 5-1 Geographical Area Codes

This figure is revised to correct USA coverage to the East and change boundary between SAM and AFR.

5.6 Airport Identifier (ARPT IDENT)

"Used On" section revised to include VHF NAVAID (ILS/DME only) and Airport Communications records.

5.7 Route Type (RT TYPE)

Enroute Airways Records Source/Content Table changed.

ORIGINAL TEXT FOLLOWS

5.7 Route Type (RT TYPE)

Definition/Description: The "Route Type" field defines the type of enroute airway, SID/STAR or approach route of which the record is an element.

Source/Content:

Enroute Airway Records (ER)

Airway Type	Field Content
Airline	A
Both (High/Low)	B
Control	C
Direct	D
high Level	H
Jet	J
Low Level	L
NDB	N
RNAV	R
Victor	V

SID Records (PD)

Route Type	Field Content
SID Runway Transition	1
SID	2
SID Enroute Transition	3
RNAV SID Runway Transition	4
RNAV SID	5
RNAV Enroute Transition	6

STAR Records (PE)

Route Type	Field Content
STAR Enroute Transition	1
STAR	2
STAR Runway Transition	3
RNAV STAR Enroute Transition	4
RNAV STAR	5
RNAV STAR Runway Transition	6
Profile Descent Enroute Transition	7
Profile Descent	8
Profile Descent Runway Transition	9

Approach Route Records (PF)

Route Type	Field Content
Approach Transition	A
Back Course	B
ILS	I
Localizer	L
RNAV	R
NDB	N
VOR	V
MLS	M

Used On: Enroute Airways, SID/STAR and Approach Route records
Length: 1 character
Character Type: Alpha/Numeric

5.12 Sequence Number (SEQ NR)

Source/Content is revised to include "Enroute airways should be sequenced in order that sequence numbers are not duplicated regardless of area covered."

"Used On" is revised to include Cruise Table, FIR/UIR, and Restrictive Airways records.

"Length" is revised to read "F Characters (Enroute Airways FIR/UIR and Restrictive Airspace, 3 Characters (SID/STAR/Approach and Company Route, 1 Character (Cruise Table)."

5.13 Waypoint Identifier (WAYPOINT IDENT)

"Used On" section is revised to remove "Company Route records." "Examples" section is revised to include RW27L. KGRR.

5.15 File Code (D/E/P)

The source/content table is revised to more accurately define the types of records to which the codes apply.

ORIGINAL TEXT FOLLOWS

5.15 File Code (D/E/P)

Definition/Description The records for a waypoint identifier in a route record may reside in one of the number of major sections of the data base. The "File Code" field permits the section in which a particular waypoint record will be found to be identified.

Source/Content:

Code	Waypoint Record Source
D	NAVAID Section (Waypoint is NAVAID)
E	Enroute Waypoint Section
P	Terminal Section (SID/STAR/APP and Company Route records)

Used On: Enroute Airways, SID/STAR/APP, Holding Pattern and Company Route records
Length: 1 character
Character Type: Alpha

5.16 Continuation Record Number (CONT NR)

"Used On" is revised to add Cruise Table, Grid MORA, and MSA records.

5.19 Level (LEVEL)

Source/Content for "B" is changed to "All Altitudes" (was Both Level Airways (not designated as high level or love level)).

5.23 Recommended VHF NAVAID (REC'D VHF)

This paragraph is reworded to accommodate the addition of the Recommended VHF NAVAID to the airport record.

Two notes are added.

5.27 Route Distance From, Holding Distance/Time (RTE DIST FROM, HOLD DIST/TIME)

A sentence is added to the end of the Source/Content section.

5.30 Altitude (ALTITUDE)

In the examples, the usage of UNKNN and NESTB on enroute records is clarified.

5.31 File Record Number (FRN)

Source/Content is revised to add that if the file reaches 99999, the next record number will start over with 00000.

5.35 NAVAID Class (CLASS)

Table (v) is revised. ("U" in column 30 defined as "Undefined NAVAID. "I," "M" were incorrectly shown in column 29. "M" was used to code Navaid power up to 50 watts.) Note 3 added.

5.37 Longitude (LONGITUDE)

Table (vi) is revised.

ORIGINAL TEXT FOLLOWS

Record File	LAT/LONG Field	Location Defined
VHF NAVAID	VOR (See Note 1)	VOR Antenna
VHF NAVAID	DME (See Note 2)	DME Antenna
Waypoint	Waypoint	Waypoint
ILS Antenna	Localizer	Localizer
ILS	Glide Slope	Glide Slope Antenna
Airport	Airport	Airport Ref. Point
Gate	Gate	Gate
Runway	Runway	Runway Threshold
NDB NAVAID	NDB	NDB Antenna

5.39 Magnetic Variation (MAG VAR)

The Source/Content section's first sentence is revised to clarify the sources for magnetic variations.

5.42 Waypoint Type (TYPE)

The table is expanded to clarify those codes allowed on Enroute Waypoints and Terminal Waypoints, and two new codes are added.

5.44 Localizer Identifier (LOC IDENT)

"Used On" is changed to read "ILS, Runway and ILS marker receives."

5.46 Runway Identifier (RUNWAY IDENT)

Source/Content section is rewritten.

ORIGINAL TEXT FOLLOWS

Source/Content: The two letters RW precede runway identifications derived from official government sources.

5.53 Transition Altitude (TRANS ALTITUDE)

Definition/Description last sentence is replaced.

ORIGINAL TEXT FOLLOWS

If the transition altitude is 18,000 feet, it may be omitted.

5.54 Airport Class (CLASS)

The name of this section is changed to Longest Runway (LONGEST RWY).

In Definition/Description section, "Airport Class" is changed to "Longest Runway." "Character Type" is changed from "Alpha" to "Numeric." "Examples" are added.

5.64 Leg Length (LEG LENGTH_

"See Figure 5-4" is added at the end of the Definition/Description section.

5.66 Station Declination (STN DEC)

ILS records added to the "Used On" list.

5.70 Vertical Angle (VERT ANGLE)

"Character Type" is changed from "Numeric" to "Alpha/Numeric." "Examples" are added.

5.72 Speed List (SPEED LIMIT)

Sentence added to the Source/Content section to cover placing the Speed Limit in the Airport Record.

5.75 From/To – Airport/Fix

This section is revised to delete "airport reference point" and "NAVAID."

ORIGINAL TEXT FOLLOWS

Definition/Description: The "From Airport/Fix" is the airport reference point, the Navaid or Waypoint from that the company route originates. The "To Airport/Fix" is the airport reference point, the Navaid or waypoint that the company route terminates.

5.79 Stopway

"The length of an" is added to the first sentence of the Definition/Description section.

5.81 ATC Indicator (ATC)

The Source/Content section is revised to distinguish between the two different conditions for the use of this field.

ORIGINAL TEXT FOLLOWS

Source/Content: This field will be used when official government source states that the altitude can be modified or assigned by ATC and will contain the alpha character "A."

5.82 Waypoint Usage

"Terminal Use Only" is added to Source/Content section.

5.88 Alternate Distance (ALT DIST)

"…from the destination airport/fix to the alternate airport" added to the last line of the Source/Content section.

5.89 Cost Index

Definition/Description section is revised.

ORIGINAL TEXT FOLLOWS

Definition/Description: The Cost Index field is used to define the cost of different Company Routes between the same city pairs.

The following new Sections added by this Supplement:

5.114 Duplicate Identifier
5.115 Direction Restriction
5.116 FIR/UIR Identifier (FIR/UIR IDENT)
5.117 FIR/UIR Indicator (IND)
5.118 Boundary VIA (BORY VIA)
5.119 Arc Distance (ARC DIST)
5.120 Arc Bearing (ARC BRG)
5.121 Lower/Upper Limit
5.122 FIR/UIR ATC Reporting Units Speed (RUS)
5.123 FIR/UIR ATC Reporting Units Altitude (RUA)
5.124 FIR/UIR Entry Report (ENTRY)
5.125 FIR/UIR Name
5.126 Restrictive Airspace Name
5.127 Maximum Altitude (MAX ALT)
5.128 Restrictive Airspace Type (REST TYPE)
5.129 Restrictive Airspace Designation
5.130 Multiple Code (MULTI CD)
5.131 Time Code (TIME CD)
5.132 NOTAM
5.133 Unit Indicator (UNIT IND)
5.134 Cruise Table Identifier (CRSE TBL IDENT)
5.135 Magnetic Track From/To (MAG TRACK FM/TO)
5.136 Cruise Level From/To
5.137 Vertical Separation
5.138 Time Indicator (TIME IND)
5.139 Time Group
5.140 Controlling Agency
5.141 Starting Latitude
5.142 Starting Longitude
5.143 MORA
5.144 MSA Center
5.145 Radium Limit
5.146 Sector Bearing (SEC BRG)
5.147 Sector Altitude (SEC ALT)
5.148 Enroute Alternate Airport (EAA)
5.149 Figure of Merit (MERIT)
5.150 Frequency Protection Distance (FREQ PRO)
5.151 FIR/UIR Address (ADDRESS)
5.152 Start/End Indicator (S/E IND)
5.153 Start/End Date

6.7.2 Header 1 Label (HDR 1)

In order to identify the cycle during which a tape is created, the Generation Number field is changed to contain the cycle date.

ATTACHMENT 2 – WAYPOINT IDENTIFIERS

CPR29, CPR29A, CPR29, CPR29B are removed from Section E.

Examples are changed to read OM25L, MM09, IM23, RW04, MA18L in Section F.

ATTACHMENT 5 – PATH AND TERMINATOR

Section added.

A family of path types is added based on track legs that are terminated as appropriate.

A new sentence is added in Rule N. Rule W is revised.

Rule AA is deleted and a new rule AA is incorporated.

ORIGINAL TEXT FOLLOWS

When a SID or STAR route is repeated with different TRANSITION ID fields, it shall be defined as a runway or enroute transition route type.

SIDE CODING RULES

SID Rule 1 is revised.

ORIGINAL TEXT FOLLOWS

I. A SID which consists of a runway transition only shall be coded as a route type 2.

SID Rule K is added.

STAR CODING RULES

Rule E is revised.

ORIGINAL TEXT FOLLOWS

E. A STAR which consists of a runway transition only will be coded as a route type 2, 5, or 8.

Rule F is added.

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SUPPLEMENT 6

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: January 31, 1986

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: November 7, 1985

A. PURPOSE OF THIS SUPPLEMENT

This Supplement incorporates airway restriction records into ARINC 424. Changes to ARINC 424 are also included to improve the operational utility of the navigation data base. New rules or clarifications to existing rules are provided by this Supplement. Editorial changes are also made by this Supplement.

B. ORGANIZATION OF THIS SUPPLEMENT

The first part of this document, printed on goldenrod paper, contains descriptions of the changes introduced into the Specification by this Supplement, and where appropriate, extracts from the original text for comparison purposes. The second part consists of replacement white pages for the Specification modified to reflect these changes. The modified and added material on each replacement page is identified with c-6 symbols in the margins.

Existing copies of Specification 424-5 may be updated by inserting the replacement white pages where necessary and destroying the pages they displace. The goldenrod pages should be inserted inside the rear cover of the Specification, following Supplement 5.

C. CHANGES TO ARINC SPECIFICATION 424 INTRODUCED BY THIS SUPPLEMENT

This Section presents a complete tabulation of the changes and additions to the Specification introduced by this Supplement. Each change or addition is identified using the section number and title currently employed or the section number and title that will be employed when the Supplement is eventually incorporated. In each case there is included a brief description of the addition or change.

3.2.2.1 VHF NAVAID Section (D) – Subsection (D)

Reference to Section 3.2.5 added.

3.2.3.1 Enroute Waypoints Section (E) – Subsection (EA)

Reference to Section 3.2.3.2 deleted. Reference to Section 3.2.3.4 added.

3.2.3.5 Enroute Airways Restrictions Section (P) Subsection (PV)

New section added.

3.2.4.11 Airport Communications Section (P) Subsection (PV)

New text for airports referenced in Subsection 3.2.4.1 added.

4.3 NDB NAVAID Record (DB)

Clarify text to specify “LF and MF” NDBs and delete obsolete table accidentally included in Supplement 6.

4.4.2 Continuation Records

Add new field.

ORIGINAL TEXT FOLLOWS

4.4.2 Continuation Records

Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23 thru 92	Notes (70)	5.61
93 thru 123	Reserved (Expansion) (34)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.5.1 Primary Records

Added new field.

ORIGINAL TEXT FOLLOWS

4.5.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 10	Region Code (4)	5.41
11 thru 27	Blank (Spacing) (17)	
28 thru 29	Duplicate Identifier (2)	5.114
35	Blank (Spacing) (17)	
36 thru 37	ICAO Code (2)	5.14
38	File Code (1)	5.15
39	Continuation Record No. (1)	5.16
40 thru 43	Inbound Holding Course (4)	5.62
44	Turn Direction (1)	5.63
45 thru 47	Leg Length (3)	5.64
48 thru 49	Leg Time (2)	5.65
50 thru 54	Altitude (5)	5.30
55 thru 98	Reserved (Expansion) (44)	
99 thru 123	Notes (25)	5.60
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.6.3 Flight Planning Continuation Records

Added new section.

4.6.4 Flight Planning Continuation Records

Added new section.

4.14.1 Primary Records

Added new field.

ORIGINAL TEXT FOLLOWS

4.14.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (Spacing) (1)	
7 thru 10	Airport Identifier/Blank (4)	5.6
11 thru 12	ICAO Code/Blank (2)	5.14
13	Blank (Spacing) (1)	
14 thru 16	Communication Type (3)	5.101
17 thru 19	Service (3)	5.106
20	Radar Service (1)	5.102

Column	Field Name (Length)	Reference
21	Blank (Spacing) (1)	
22	Continuation Record No. (1)	5.16
23 thru 29	Primary Comm Freq (7)	5.103
30	Modulation (1)	5.104
31 thru 32	Blank (Spacing) (2)	
33 thru 41	Facility Latitude (9)	5.36
42 thru 51	Facility Longitude (10)	5.37
52 thru 56	Magnetic Variation (5)	5.39
57 thru 61	Facility Elevation (5)	5.92
62 thru 68	Comm Freq	5.103
69	Modulation (1)	5.104
70 thru 76	Comm Freq (7)	5.103
77	Modulation (1)	5.104
78 thru 84	Comm. Freq (7)	5.103
85	Modulation (1)	5.104
86 thru 92	Comm Freq (7)	5.103
93	Modulation (1)	5.104
94 thru 100	Comm Freq (7)	5.103
101	Modulation (1)	5.104
102 thru 108	Comm Freq (7)	5.103
109	Modulation (1)	5.104
110 thru 116	Comm Freq (7)	5.103
117	Modulation (1)	5.104
118 thru 123	Reserved (Expansion) (6)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.15.1 Primary Records

Added new field.

ORIGINAL TEXT FOLLOWS

4.15.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 13	Blank (Spacing) (7)	
14 thru 17	Marker Ident	5.110
18 thru 19	Blank (Spacing)	
20 thru 21	ICAO Code (2)	5.14
22	Continuation Record No. (1)	5.16
23 thru 26	Marker Code (4)	5.11
27	Blank (Reserved/Spacing) (1)	
28	Marker Shape (1)	5.112
29	Marker Power (1)	5.113
30 thru 33	Blank (Spacing) (4)	
34 thru 41	Marker Latitude (9)	5.36
42 thru 51	Marker Longitude (10)	5.37
52 thru 55	Minor Axis (4)	5.100
56 thru 74	Blank (Reserved) (19)	
75 thru 79	Magnetic Variation (2)	5.39
80 thru 84	Facility Elevation (5)	5.92
85 thru 93	Blank (Reserved) (9)	
94 thru 123	Marker Name (30)	5.71
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.16.1 Primary Records

Added new field.

ORIGINAL TEXT FOLLOWS

4.16.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Blank (Spacing) (3)	
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 8	Cruise Table Identifier (2)	5.134
9	Sequence Number (1)	5.12
10 thru 28	Blank (Spacing) (19)	
29 thru 32	Magnetic Track From (4)	5.135
33 thru 36	Magnetic Track To (4)	5.135
37 thru 39	Blank (Spacing) (3)	
40 thru 44	Cruise Level From (5)	5.136
45 thru 49	Vertical Separation (5)	5.137
50 thru 54	Cruise Level To (5)	5.136
55 thru 59	Cruise Level From (5)	5.136
60 thru 64	Vertical Separation (5)	5.137
65 thru 69	Cruise Level To (5)	5.136
70 thru 74	Cruise Level From (5)	5.136
75 thru 79	Vertical Separation (5)	5.137
80 thru 84	Cruise Level To (5)	5.136
85 thru 89	Cruise Level From (5)	51.36
90 thru 94	Vertical Separation (5)	5.137
95 thru 99	Cruise Level To (5)	5.136
100 thru 123	Reserved (Expansion) (24)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.17.1 Primary Records

Added new field.

ORIGINAL TEXT FOLLOWS

4.17.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type 91)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 10	FIR/UIA Identifier (4)	5.116
11 thru 12	FIR/UIR Address	5.151
13	FIR/UIR Indicator (1)	5.117
14 thru 17	Sequence Number (4)	5.12
18	Continuation Record No. (1)	5.16
19 thru 22	Adjacent FIR Identifier (4)	5.11
23 thru 26	Adjacent UIR Identifier (4)	5.11
27	Reporting Units Speed (1)	5.122
28	Reporting Units Altitude (1)	5.123
29	Entry Report (1)	5.124
30	Blank (Spacing) (3)	
31 thru 32	Boundary Via (2)	5.118
33 thru 41	FIR/UIR Latitude (9)	5.36
42 thru 51	FIR/UIR Longitude (10)	5.37
52 thru 60	Arc Origin Latitude (9)	5.36
61 thru 70	Arc Origin Longitude (10)	5.37
71 thru 74	Arc Distance (4)	5.119
75 thru 78	Arc Bearing (4)	5.120
79 thru 83	FIR Upper Limit (5)	5.121
84 thru 88	UIR Lower Limit (5)	5.121
89 thru 93	UIR Upper Limit (5)	5.121
94 thru 123	FIR/UIR Name (30)	5.125
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.19.1 Primary Records

Added new field.

ORIGINAL TEXT FOLLOWS

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Blank (Spacing) (3)	
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 13	Blank (Spacing) (7)	
14 thru 16	Starting Latitude (3)	5.141
17 thru 20	Starting Longitude (4)	5.142
21 thru 30	Blank (Spacing) (3)	
31 thru 33	MORA (3)	5.143
34 thru 36	MORA (3)	5.143
37 thru 39	MORA (3)	5.143
50 thru 42	MORA (3)	5.143
43 thru 45	MORA (3)	5.143
49 thru 51	MORA (3)	5.143
52 thru 54	MORA (3)	5.143
55 thru 57	MORA (3)	5.143
58 thru 60	MORA (3)	5.143
61 thru 63	MORA (3)	5.143
64 thru 66	MORA (3)	5.143
67 thru 69	MORA (3)	5.143
70 thru 72	MORA (3)	5.143
73 thru 75	MORA (3)	5.143
76 thru 78	MORA (3)	5.143
79 thru 81	MORA (3)	5.143
82 thru 84	MORA (3)	5.143
85 thru 87	MORA (3)	5.143
88 thru 90	MORA (3)	5.143
91 thru 93	MORA (3)	5.143
94 thru 96	MORA (3)	5.143
97 thru 99	MORA (3)	5.143
100 thru 102	MORA (3)	5.143
103 thru 105	MORA (3)	5.143
106 thru 108	MORA (3)	5.143
109 thru 111	MORA (3)	5.143
112 thru 114	MORA (3)	5.143
115 thru 117	MORA (3)	5.143
118 thru 120	MORA (3)	5.143
121 thru 123	Reserved (Expansion) (3)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.20.1 Primary Records

Added new field.

ORIGINAL TEXT FOLLOWS

4.20.1 Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer/Area Code (3)	5.3
5	Section Code (1)	5.4
6	Blank (Spacing) (1)	
7 thru 10	Airport (ICAO) Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5.5
14 thru 18	MSA Center (5)	5.144
19 thru 20	ICAO Code (2)	5.14
21	File Code (1)	5.15
22	Subsection Code (1)	5.5
23 thru 24	Radius Limit (2)	5.145
25 thru 27	Sector Bearing (3)	5.146

4.21 Enroute Airways Restriction Records (EU)

New section added.

4.21.1 Primary Records

New record table added.

4.21.2 Continuation Records

New record table added.

4.21.3 Continuation Records

New record table added.

Table 4.1 Record Format

New records and new fields added to reflect changes in Section 4.

ORIGINAL TEXT FOLLOWS

Table 4.1 Record Format (see Pgs. 5-10)

5.3 Customer/Area Code (SUB CODE)

Added new examples.

5.5 Subsection Code (SUB CODE)

Add new subsection code to section code E for airway restrictions (U).

5.17 Waypoint Description Code (DESC CODE)

Expansion of note "++."

ORIGINAL TEXT FOLLOWS

++ Not used in combination with "G" in column 40.

Figure 5-2 7 SUBDIVISIONS FOR UNITED STATES

Figure replaced with a clearer reproduction with the names of states included.

5.23 Recommended VHF NAVAID REC'D VHF)

Expansion of reference for final approach note to indicate referenced NAVAID.

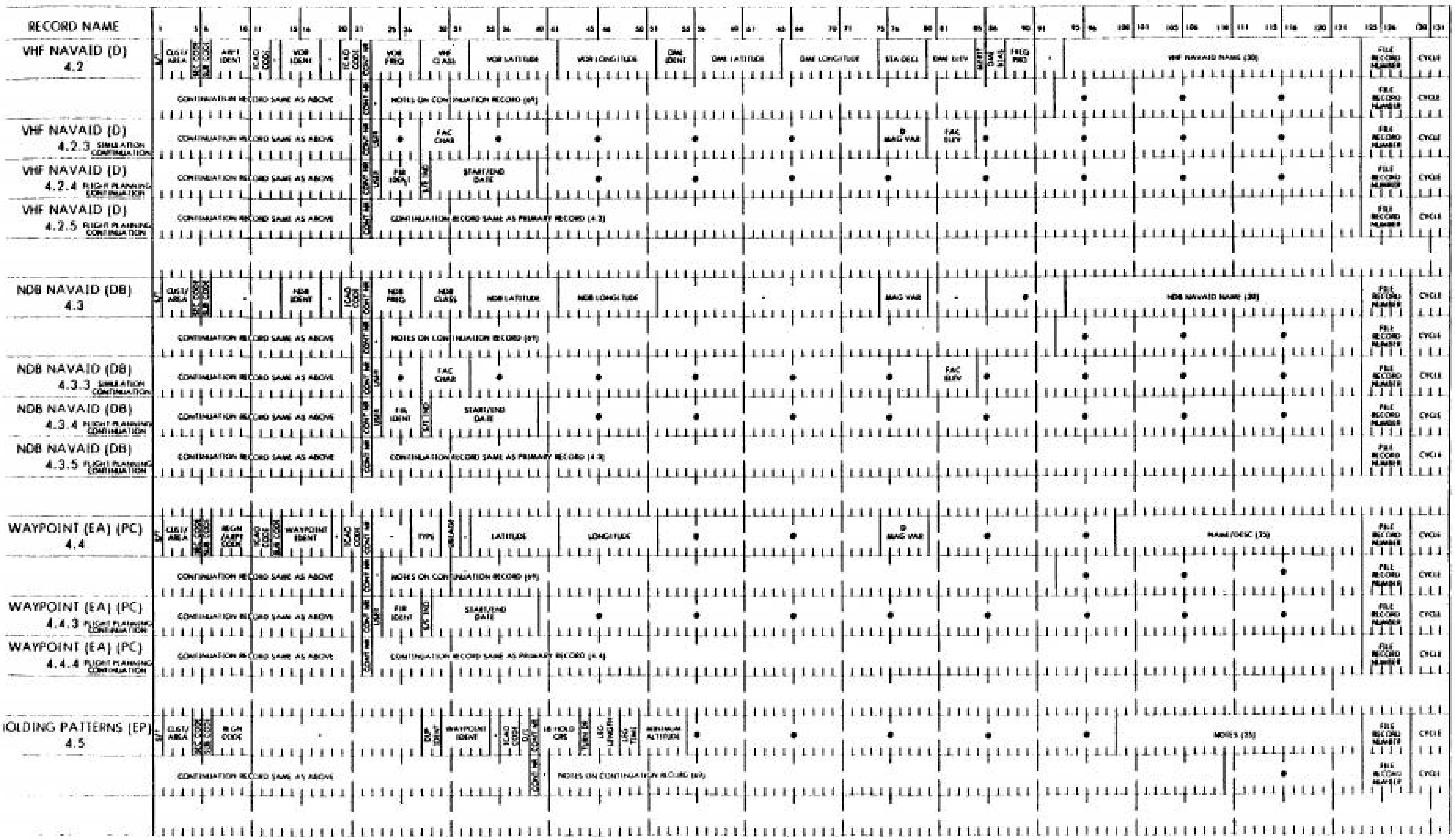
ORIGINAL TEXT FOLLOWS

For Localizer based Approach Transitions ending in an intercept of the localizer or course to Final Approach Course Fix and the Final Approach path, the Recommended VHF NAVAID must be the referenced Localizer. For VOR Approach the final approach path must be the referenced VOR.

5.30 Altitude (ALTITUDE)

Expand title and text (new paragraph) to include minimum altitude. Delete reference to Attachment 4.

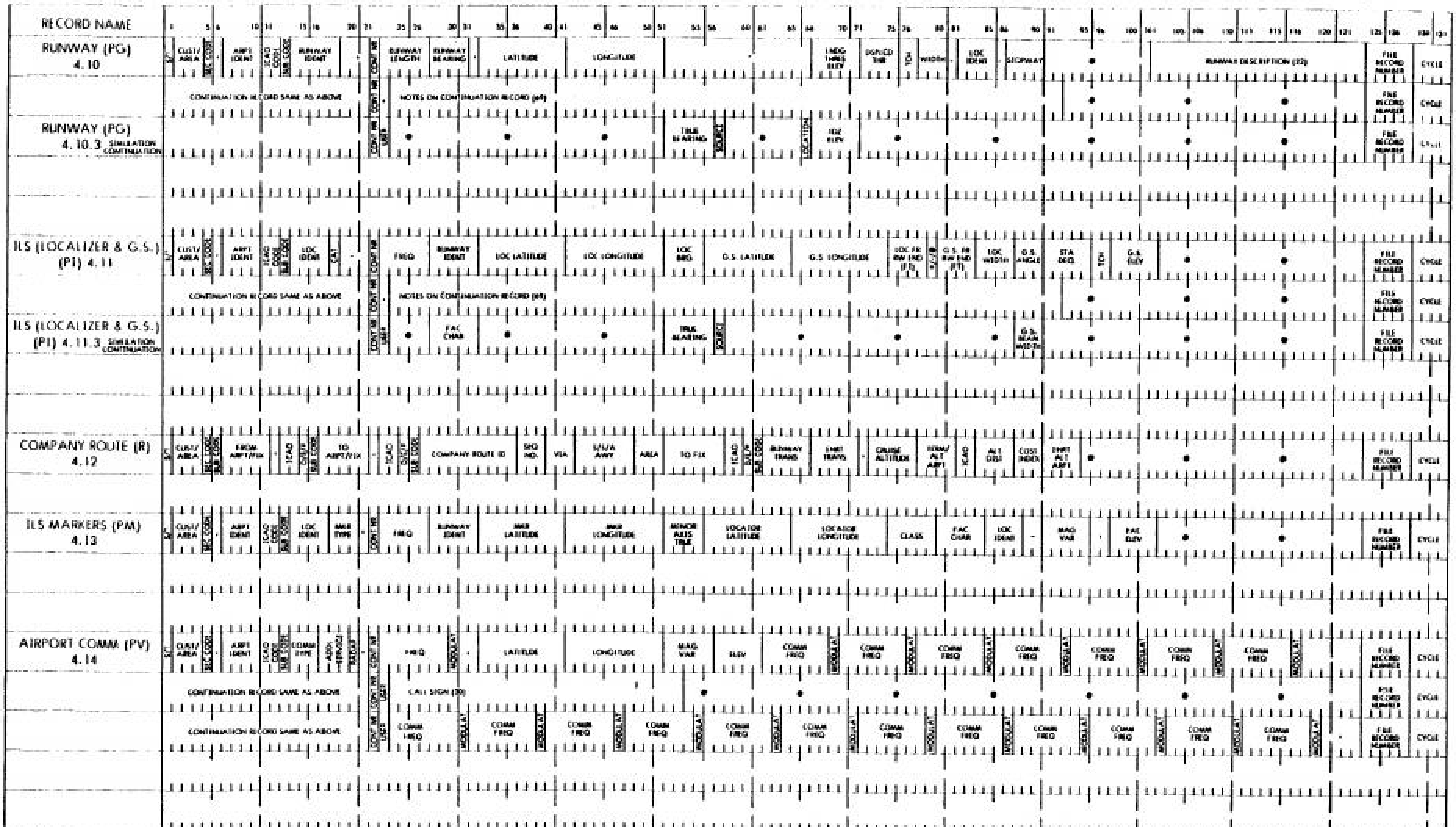
ARINC 424-5 RECORD FORMAT



ARINC 424-5 RECORD FORMAT

RECORD NAME	Fields (columns 1–132)
ENROUTE AIRWAYS (ER) 4.6	S/T · CUST/AREA · SEC CODE · SUB CODE · • · ROUTE IDENT · SIX CHAR · • · SEQ NR · WAYPOINT IDENT · ICAO CODE · SEC · SUB · CONT NR · DESC CODE · BDY CODE · RT TYPE · LEVEL · DIRECT · FC IND · • · RECD VHF · ICAO CODE · • · THETA · RHO · OB MAG CRS · ROUTE DIST FROM · IB MAG CRS · • · MIN ALTITUDE · MAX ALTITUDE · • · • · • · FILE RECORD NUMBER · CYCLE
	CONTINUATION RECORD SAME AS ABOVE · CONT NR · • · NOTES ON CONTINUATION RECORD (69) · • · FILE RECORD NUMBER · CYCLE
AIRPORT (PA) 4.7	S/T · CUST/AREA · SEC CODE · • · ARPT IDENT · ICAO CODE · SUB CODE · ATA/IATA · • · CONT NR · SPEED LIMIT ALTITUDE · LONGEST RWY · IFR · • · LATITUDE · LONGITUDE · MAG VAR · ELEV · SPEED LIMIT · RECD VHF · ICAO CODE · • · • · AIRPORT NAME (30) · FILE RECORD NUMBER · CYCLE
	CONTINUATION RECORD SAME AS ABOVE · CONT NR · • · NOTES ON CONTINUATION RECORD (69) · • · • · • · FILE RECORD NUMBER · CYCLE
AIRPORT (PA) 4.7.3 FLIGHT PLANNING CONTINUATION	CONTINUATION RECORD SAME AS ABOVE · CONT NR · APPL · FIR IDENT · S/T IND · START/END DATE · • · • · • · • · • · • · • · • · FILE RECORD NUMBER · CYCLE
AIRPORT (PA) 4.7.4 FLIGHT PLANNING CONTINUATION	CONTINUATION RECORD SAME AS ABOVE · CONT NR · CONTINUATION RECORD SAME AS PRIMARY RECORD (4.7) · FILE RECORD NUMBER · CYCLE
GATE (PB) 4.8	S/T · CUST/AREA · SEC CODE · • · ARPT IDENT · ICAO CODE · SUB CODE · GATE IDENT · • · CONT NR · • · LATITUDE · LONGITUDE · • · • · • · • · • · NOTES (35) · FILE RECORD NUMBER · CYCLE
	CONTINUATION RECORD SAME AS ABOVE · CONT NR · • · NOTES ON CONTINUATION RECORD (69) · • · • · • · FILE RECORD NUMBER · CYCLE
SIDS/STARS/APPROACH (PD/PE/PF) 4.9	S/T · CUST/AREA · SEC CODE · • · ARPT IDENT · ICAO CODE · SUB CODE · SID/STAR/APP IDENT · RT TYPE · TRANS IDENT · • · SEQ NR · WAYPOINT IDENT · • · ICAO CODE · SEC · SUB · CONT NR · DESC CODE · TURN DIR · • · PATH TERM · TDV · RECD VHF · ICAO CODE · • · THETA · RHO · OB MAG CRS · RTE DIST FROM HOLD DIST/TIME · • · ALT DESC · ATC · ALTITUDE · ALTITUDE · TRANS ALTITUDE · SPEED LIMIT · VERT ANGLE · • · • · FILE RECORD NUMBER · CYCLE
	CONTINUATION RECORD SAME AS ABOVE · CONT NR · • · NOTES ON CONTINUATION RECORD (69) · • · FILE RECORD NUMBER · CYCLE
SIDS/STARS/APPROACH (PD/PE/PF) 4.9.3 FLIGHT PLANNING CONTINUATION	CONTINUATION RECORD SAME AS ABOVE · CONT NR · APPL · S/T IND · START/END DATE · • · • · ADJ COST · • · • · • · • · FILE RECORD NUMBER · CYCLE
SIDS/STARS/APPROACH (PD/PE/PF) 4.9.4 FLIGHT PLANNING CONTINUATION	CONTINUATION RECORD SAME AS ABOVE · CONT NR · CONTINUATION RECORD SAME AS PRIMARY RECORD (4.9) · FILE RECORD NUMBER · CYCLE

ARINC 424-5 RECORD FORMAT



ARINC 424-5 RECORD FORMAT

RECORD NAME	Fields (columns 1–132, in order)
ENROUTE MARKERS (EM) 4.15	S/T; CUST/AREA; SEC CODE; SUB CODE; •; MARKER IDENT; •; ICAO CODE; CONT NR; MARKER CODE; •; SHAPE; HI/LOW; •; LATITUDE; LONGITUDE; MINOR AXIS TRUE; •; MAG VAR; FAC ELEV; •; MARKER NAME (30); FILE RECORD NUMBER; CYCLE
CRUISING TABLES (TC) 4.16	S/T; •; SEC CODE; SUB CODE; CRUISE TBL IDENT; SEQ NR; •; •; MAG TRACK FM; MAG TRACK TO; •; CRUISE LEVEL FROM; VERTICAL SEPARATION; CRUISE LEVEL TO; CRUISE LEVEL FROM; VERTICAL SEPARATION; CRUISE LEVEL TO; CRUISE LEVEL FROM; VERTICAL SEPARATION; CRUISE LEVEL TO; CRUISE LEVEL FROM; VERTICAL SEPARATION; CRUISE LEVEL TO; •; •; FILE RECORD NUMBER; CYCLE
FIR/UIR (UF) 4.17	S/T; CUST/AREA; SEC CODE; SUB CODE; FIR/UIR IDENT; ADDRESS; IND; SEQ NR; CONT NR; ADJ FIR IDENT; ADJ UIR IDENT; RUS; RAS; ENTRY; •; BDRY VIA; FIR/UIR LATITUDE; FIR/UIR LONGITUDE; ARC ORIGIN LATITUDE; ARC ORIGIN LONGITUDE; ARC DIST; ARC BRG; FIR UPPER LIMIT; UIR LOWER LIMIT; UIR UPPER LIMIT; FIR/UIR NAME (30); FILE RECORD NUMBER; CYCLE
RESTRICTIVE AIRSPACE (UR) 4.18	S/T; CUST/AREA; SEC CODE; SUB CODE; ICAO CODE; REST TYPE; RESTRICTIVE AIRSPACE DESIGNATION; MULTI CD; SEQ NR; CONT NR; •; TIME CD; NOTAM; •; BDRY VIA; LATITUDE; LONGITUDE; ARC ORIGIN LATITUDE; ARC ORIGIN LONGITUDE; ARC DIST; ARC BRG; •; LOWER LIMIT; UNIT IND; UPPER LIMIT; UNIT IND; RESTRICTIVE AIRSPACE NAME (30); FILE RECORD NUMBER; CYCLE
(continuation)	CONTINUATION RECORD SAME AS ABOVE; CONT NR; •; TIME CD; NOTAM; TIME IND; •; START/END DATE; •; TIME GROUP; TIME GROUP; TIME GROUP; TIME GROUP; TIME GROUP; TIME GROUP; TIME GROUP; CONTROLLING AGENCY (25); FILE RECORD NUMBER; CYCLE
GRID MORA RECORDS (AS) 4.19	S/T; •; SEC CODE; SUB CODE; •; START LAT; START LONG; •; MORA; •; FILE RECORD NUMBER; CYCLE
MSA (PS) 4.20	S/T; AREA; SEC CODE; •; ARPT IDENT; ICAO CODE; SUB CODE; MSA CENTER; ICAO CODE; MULTI CD; SUB CODE; RADIUS LIMIT; SEC BRG; SEC ALT; SEC BRG; SEC ALT; SEC BRG; SEC ALT; SEC BRG; SEC ALT; SEC BRG; SEC ALT; SEC BRG; SEC ALT; SEC BRG; SEC ALT; •; •; •; •; •; •; •; FILE RECORD NUMBER; CYCLE

5.35 <u>NAVAID Class (CLASS)</u>

VHF NAVAID Table is expanded to include ILS/TACAN installations. Note 4 is added.

<u>ORIGINAL TEXT FOLLOWS</u>

Facility	Record Column				
	28	29	30	31	32
VHF Navaid					
VOR	V				
TACAN Channels 17-50 and 70-117		T			
TACAN Channels 1-16 and 60-69		M			
DME		D			
ILS/MDE		I			
Biased ILS/DME				D	
Terminal			T		See Note 1
Low Altitude			L		
High Altitude			H		
Unrestricted (see Note 3)			U		

5.39 <u>Magnetic Variation</u>

Delete "Airport Magnetic Variation" from Terminal Waypoint record.

5.54 <u>Longest Runway (LONGEST RWY)</u>

Table deleted. Runway field entry was changed from alpha characters to numerical length in Supplement 5.

<u>ORIGINAL TEXT FOLLOWS</u>

Available Runway	Field Entry
6000 feet and over	A
5000 to 5999 feet	B
4000 to 4999 feet	C
3000 to 3999 feet	D
Less than 3000 feet	E

Figure 5-3 RUNWAY PLAN AND PROFILE

More comprehensive figure replaced previous figure.

5.115 <u>Direction Restriction</u>

New text encompasses use of direction restriction for airway restriction records.

<u>ORIGINAL TEXT FOLLOWS</u>

Definition/Description: The "Direction Restriction" field will be used to indicate the direction an Enroute Airway is to be flown when such restrictions apply.

Source/Content: One Way direction restrictions should be derived from official government sources.

F = One Way in direction Route is coded.
B = One Way in opposite direction Route is coded.
Blank = No restriction on direction.

Used On: Enroute Airways records
Length: 1 character
Character Type: Alpha

5.118 <u>Boundary Via (BDRY VIA)</u>

Definition/Description: The "Boundary Via" field defines the path of the boundary from the position identified in the record to the next position.

Source/Content: The path of the boundary will be determined from official government sources and the "Boundary Via" selected from the following table:

Column 1	Column 2	Description
A		Arc by edge
C		Circle
	E	End of description, return to original point
G		Great Circle
H		Rhumb Line
L		Counter Clockwise Arc
R		Clockwise Arc

Note: Special Use Airspace designated as following rivers, country boundaries or other political boundaries will be averaged using a straight line so that no path will be greater than two nautical miles from the actual boundary.

Used On: FIR/UIR, Restrictive Airspace records
Length: 2 characters
Character Type: Alpha

5.119 <u>Arc Distance (ARC DIST)</u>

Add "C" to the Arc Distance field content list in Source Content paragraph.

5.121 <u>Lower/Upper Limit</u>

Delete "control airspace" from Definition/Description paragraph.

5.127 <u>Maximum Altitude (MAX ALT)</u>

Definition/Description: The "Maximum Altitude" field is used to indicate the maximum altitude allowed.

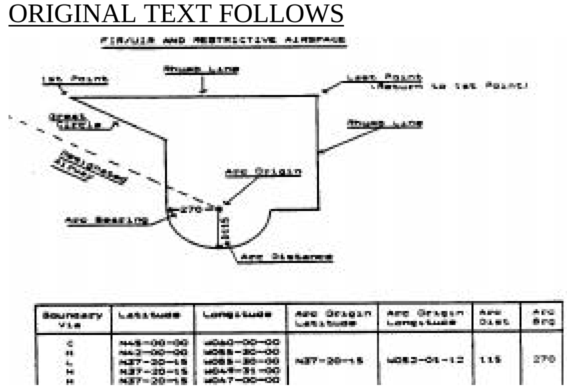
Source/Content: Maximum altitudes should be derived from official government publications describing the upper limit of the airway in feet or flight level.

Used On: Enroute Airway records
Length: 5 characters
Character Type: Alpha/Numeric
Examples: 18000, FL100, FL460

Figure 5-6 FIR/UIR AND RESTRICTIVE AIRSPACE

Revised figure added expanding detail to include shoreline.

<u>ORIGINAL TEXT FOLLOWS</u>



Boundary Via	Latitude	Longitude	Arc Origin Latitude	Arc Origin Longitude	Arc Dist	Arc Brg
C	N45-00-00	W060-00-00				
H	N43-00-00	W055-30-00				
L	N37-20-15	W055-30-00	N37-20-15	W052-01-12	115	270
H	N37-20-15	W049-31-00				
H	N37-20-15	W047-00-00				

5.131 Time Code (TIME CD)

Clarification added stating that the time code field will be blank wen the active times are only given by NOTAMs.

5.134 Cruise Table Identifier (CRSE TBL IDENT)

Table modified for new field coding. Text modified to include course as either true or magnetic, rather than magnetic only.

ORIGINAL TEXT FOLLOWS

Field Entry	Description
00	ICAO standard cruise table
0A	Exception to ICAO cruise table
10	Modified cruise table
1A	Exception to modified cruise table

5.135 Magnetic TRACK FROM/TO ((MAG TRACK FM/TO)

Text modified to change "magnetic track" to "course."

ORIGINAL TEXT FOLLOWS

Definition/Description: The "Magnetic Track From" field is used to indicate the lowest track for which a block of cruising levels are prescribed. The "Magnetic Track To" field is used to indicate the highest magnetic track for which a block of cruising levels are prescribed.

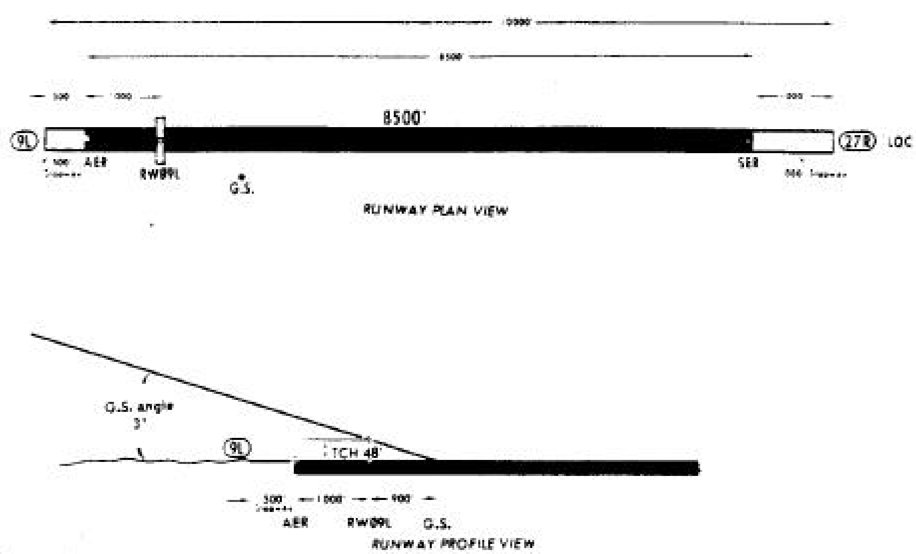
Source/Content: The Magnetic Tracks will be derived from official government sources in degrees and tenths of degree with the decimal point suppressed.

5.136 Cruise Level From/To

Definition/Description revised to complement the use of course in place of magnetic track in Section 5.135.

Figure 5-3

RUNWAY DESCRIPTION



AER-Approach end of runway
N39°45'18.43" W104°53'42.96"

RWØ9L Landing threshold for runway 9L
N39°45'18.43" W104°53'28.37"

G.S.-Glide Slope
N39°45'15.96" W104°53'14.08"
G.S. Dist from AER- 1900'

TCH- G.S. altitude above landing threshold 48'

SER- Stop end of runway
N39°45'18.43" W104°51'38.72"

LOC-Localizer
N39°45'18.43" W104°51'22.19"
Loc Dist from SER-1300'

Landing distance beyond

	Threshold	Glide Slope
9L	7500'	6600'
27R	8500'	

Landing threshold elevation is elevation at RWØ9L

ORIGINAL TEXT FOLLOWS

Definition/Description: The "Cruise Level From" field is used to indicate the lowest cruising level prescribed for use within the Magnetic Track From/To fields. The "Cruise Level To" field is used to indicate the highest cruising level prescribed for use within the Magnetic Track From/To fields.

5.139 Time Group

Examples expanded to include references to sunrise and sunset.

5.151 FIR/UIR Address (ADDRESS)

Source/Content revised to define two letter designators to be used when addressing ATS messages.

ORIGINAL TEXT FOLLOWS

Source/Content: Addresses of FIR/UIR will be derived from official government sources and entered in this field.

5.154 Restriction Identifier (REST IDENT)

New field added to define airway restriction record.

5.155 Airway Restriction Note Indicator (NOTE IND)

New field added to define airway restriction record.

5.156 Active Indicator (ACT IND)

New field added to define airway restriction record.

5.157 Airway Restriction Start/End Date (START/END DATE)

New field added to define airway restriction record.

5.158 Airway Restriction Start/End Time (START/END TIME)

New field added to define airway restriction record.

5.159 Weekly Frequency (WEEKLY FREQ)

New field added to define airway restriction record.

5.160 Units of Altitude (UNIT IND)

New field added to define airway restriction record.

5.161 Restriction Altitude (REST ALT)

New field added to define airway restriction record.

5.162 Step Climb Indicator (STEP)

New field added to define airway restriction record.

5.163 Restriction Notes

New field added to define airway restriction record.

5.164 EU Indicator (EU IND)

New field added to define airway restriction record.

5.165 Magnetic/True Indicator (M/T IND)

New field added to define airway restriction record.
ATTACHMENT 2 – WAYPOINT IDENTIFIERS

B. NAMED RNAV Waypoints, Intersections and Reporting Points

The description, addressing only the United States, has been expanded to describe rules covering the naming of points worldwide.

ORIGINAL TEXT FOLLOWS

B. NAMED RNAV Waypoints, Intersections and Reporting Points.

In the United States, these waypoints will be assigned unique 5-character names by the FAA. As the FAA assigns names to new or established waypoints, the identifier will be the same as the name. For all other waypoints, identifiers should be developed using the following rules sequentially until 5-character (or fewer) groups emerge.

B.3 Phonetic Letter Names

The use of the minus (-) sign is deleted from this section.

ORIGINAL TEXT FOLLOWS

3. Phonetic Letter Names

When an ICAO phonetic alpha character is used as a waypoint name (Alpha, Bravo, Charlie, etc.), use the equivalent letter (A, B, C, etc.) followed by a minus (-) sign and the two-letter ICAO code for the country in which the waypoint is located to produce a 4-character identification code. When more than one waypoint in a country has the same phonetic name, obtain uniqueness by adding a numeric character after ICAO country code.

D. Un-Named Turn Points and Intersections

This section is expanded to include bearing/distance waypoints.

F. Terminal Waypoints

F.2 Turn Points

This section deleted. Section F.3 renumbered F.2.

ORIGINAL TEXT FOLLOWS

F. Terminal Waypoints

2. Turn Points

Special turn points required to establish a procedural turn should be assigned identifiers in numerical sequence. The number should be preceded by the characters "TP." Examples: TP1, TP2, TP3.

ATTACHMENT 3 – NAVIGATION CHART/FILE DATA RELATIONSHIP

These figures showing examples are unnecessarily complex. These figures have been replaced with simplified "generic" examples. The old text is not included in this Supplement.

ATTACHMENT 4 – AIRWAY MINIMUM ALTITUDES

Text and figures showing examples are obsolete. These figures have been replaced with simplified "generic" examples which will not require updating. The old text is not included in this Supplement.

ATTACHMENT 5 – PATH AND TERMINATOR

The first paragraph is expanded to indicate the precedence of specific rules over general rules for path terminator assignments.

The first two sentences of the second paragraph are expanded to clarify the selection and use of path terminators.

ORIGINAL TEXT FOLLOWS

PATH AND TERMINATOR

Path Terminators are assigned to all SID/STAR/Approach records in accordance with the rules set forth in this attachment. The general intent of the Path Terminator concept is to permit the coding of standard terminal are procedures without proliferating the number of named waypoints required to support the procedures.

To avoid proliferation of leg types to be implemented within any given system, it is desirable that systems be designed to accept either VX or CX leg types, but not necessarily both. Selection could then be made by system type or area of operation, and the relevant data base coded accordingly. In order to achieve this and to ultimately simplify the path/terminator matrix currently required to define present-day terminal area procedures, it is in the interest of all user airlines to prevail upon their government agencies and ATC authorities to: (1) permit FMS-equipped airplanes to fly tracks instead of procedural headings, and (2) design terminal area procedures to be compatible with the capabilities of increasing number of FMS-equipped airplanes entering service.

5. Intercept Angles

Add new section.

ATTACHMENT 5 – PATH AND TERMINATOR GENERAL RULES

Rule A.

CI coding is deleted. CD and CR coding is added.

ORIGINAL TEXT FOLLOWS

GENERAL RULES

A. The following leg types are NAVAID oriented and the defining parameters will be found in the RECD, VHF, RHO, THETA, OB MAG CRS, and WAYPINT IDENT fields:

AF	CI	FC	FM	VD
CF	FA	FD	PI	VR

Rule N.

The rule is expanded to state that turn direction will be indicated if the turn equals or exceeds 90 degrees.

Rule V.

Delete CI.

ORIGINAL TEXT FOLLOWS

V. When a CI or TI leg is followed by an AF leg, the "course" or "track to" must be to the DME which defines the AF arc.

Rule W.

Add subsection AC, AD and AE.

ATTACHMENT 5 – PATH AND TERMINATORS SID CODING RULES

Rule A.

Revise Rule A to clarify text on CA, VA and FA coding and to state that course legs are preferred over heading legs as a first leg of a SID transition.

ORIGINAL TEXT FOLLOWS

SID CODING RULES

A. If on take-off there is a turn greater than 15° without an altitude specified before the turn, a course from or a heading to an altitude (CA, FA or VA) leg will be coded before the turn, using runway heading for the VA leg terminating at 400 feet above the airport elevation. This altitude may vary with local controlling agency requirements.

ATTACHMENT 5 – PATH AND TERMINATOR APPROACHES AND APPROACH TRANSITIONS

A. General

Add paragraph 10.

B. VOR Approach

Revise Rule 2 to indicate government specified, non-FMS procedures.

ORIGINAL TEXT FOLLOWS

B. VOR Approach Coding

2. The recommended VHF will be the procedure specified NAVAID.

ATTACHMENT 5 – Rule G paragraph 2

Revised to indicate the preference of a course leg over a heading leg as the first leg of a missed approach.

ORIGINAL TEXT FOLLOWS

G. Missed Approaches

2. The first leg of the missed approach will contain an altitude to command a climb. If a turn in excess of 15° from runway heading is required, then a CA, VA or FA leg on the runway heading to 400 feet above the airport elevation will be the first leg of the missed approach followed by the required turn.

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SUPPLEMENT 7

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: January 14, 1987

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: October 8, 1986

A. PURPOSE OF THIS SUPPLEMENT

This Supplement incorporates microwave landing system (MLS) records into ARINC 424. Changes to ARINC 424 are also included to improve the operational utility of the navigation data base. New rules or clarifications to existing rules are provided by this Supplement.

B. ORGANIZATION OF THIS SUPPLEMENT

The first part of this Supplement printed on goldenrod colored paper, contains descriptions of the changes introduced into the Specification by this Supplement. The second part consists of replacement white pages for the Specification modified to reflect these changes. The modified and added material on each replacement page is identified with c-7 symbols in the margins.

Existing copies of Specification 424-6 may be updated by inserting the replacement pages where necessary and destroying the pages they displace. The goldenrod colored Supplement should be inserted inside the rear cover of the Specification following Supplement 6.

C. CHANGES TO ARINC SPECIFICATION 424 INTRODUCED BY THIS SUPPLEMENT

This Section presents a complete tabulation of the changes and additions to the Specification introduced by this Supplement. Each change is identified using the Section number and title that will be employed when the Supplement is incorporated. In each case there is included a brief description of the addition or change and, for other than very minor revisions, any text originally contained in the Specification is reproduced for reference.

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SUPPLEMENT 8

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: October 15, 1989

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: February 26, 1989

A. PURPOSE OF THIS SUPPLEMENT

This Supplement incorporates revision of the current Airport Communications record and the addition of Enroute 424. Changes to ARINC Specification 424 are also included to improve the operational utility of the navigation data base. New rules or clarifications to existing rules are provided by this Supplement

B. ORGANIZATION OF THIS SUPPLEMENT

The first part of this Supplement printed on goldenrod colored paper, contains descriptions of the changes introduced into the Specification by this Supplement. The second part consists of replacement white pages for the Specification modified to reflect these changes. The modified and added material on each replacement page is identified with c-8 symbols in the margins.

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C. CHANGES TO ARINC SPECIFICATION 424 INTRODUCED BY THIS SUPPLEMENT

This Section presents a complete tabulation of the changes and additions to the Specification introduced by this Supplement. Each change is identified using the Section number and title that will be employed when the Supplement is incorporated. In each case there is included a brief description of the addition or change and, for other than very minor revisions, any text originally contained in the Specification is reproduced for reference.

2.2 Special Navigation Terms

Editorial correction of EA to ER in the Enroute Airway to Restrictive Airspace Link definition.

3.2.2.1 VHF NAVAID

MLS DMEs added to descriptive paragraph.

3.2.3.6 Enroute Communication Section

Add new section.

3.2.4.6 Airport Approach Section (P)

New table added after first paragraph.

3.2.4.11 MSA Section (P)

Statement paragraph revised.

3.2.9 Heliport Section (H)

Add new section.

4.2.4 Flight Planning Continuation Records

Add the UIR Identifier field to the VHF NAVAIDS Flight Planning Continuation record.

4.3.1 Primary Records

Add the Airport Identifier and Airport ICAO fields to the NDB NAVAID Primary record.

4.3.4 Flight Planning Continuation Records

Add the UIR Identifier field to the NDB NAVAID Flight Planning Continuation record.

4.4.3 Flight Planning Continuation Records

Add the UIR identifier field to the Waypoint Flight Planning Continuation record.

4.6.1 Primary Records (ER)

Deleted the reference paragraph number shown for Column 83. Note under box to read Note 1.

4.7.1 Primary Records (PA)

New fields added.

4.7.3 Flight Planning Continuation Records

Add the UIR Identifier field to the Airport Flight Planning Continuation record.

4.9.1 SID/STAR/Approach Primary Records

Column 124 through 128 revised to read File Record Number (5).

4.12.1 Primary Records (R)

Columns 15, 16, 25, 26, 60, 61 and 82 through 83 revised.

4.14 Airport Communications Records (PV)

Replaced Airport Communications Records Section.

4.20.1 Primary Records

Columns 21 and 73 through 123 revised.

4.23 Enroute Communications Records (EV)

New Enroute Communications record added.

4.24 Heliport Records (HA)

New Heliport record added.

Table 4-1 Record Format

New records and new fields added to reflect changes in Section 4.

5.5 Subsection Code

New Subsection Code for Enroute Communications added.

5.6 Airport Identifier (ARPT IDENT)

Title revised to Airport/Heliport Identifier (ARPT/HELI IDENT). Used On revised to contain Airport and

Heliport Identifier categories. NDB Navaid Records added to Used On Airport Identifier category. Heliport Records added to Used On Heliport Identifier category.

5.15 File Code

New file code added for Approach records. Deleted File code for Company Route records.

5.17 Waypoint Description Code

New Waypoint Description for NDB Navaids added.

5.23 Recommended NAVAID

Definition/Description, Used On and Table 5-1 revised.

5.24 Theta

Definition/Description and final note revised. Added new example.

5.25 Rho

Added new example.

5.29 Altitude Descript

First note and Used On revised.

5.30 Altitude/Minimum Altitude

Source/Content revised.

5.36 Latitude

Enroute Communication and Heliport records added to Used On.

5.37 Longitude

Enroute Communication and Heliport records added to Used On. New Heliport entry added to table.

5.39 Magnetic Variation

Enroute Communication and Heliport records added to Used On.

5.42 Waypoint Type

Enroute Waypoint Table revised. Used On, Length and Character Type added.

5.44 Localizer/MLS Identifier (LOC IDENT) (MLS IDENT)

Editorial correction to title.

5.53 Transition Altitude/Level (TRANS ALTITUDE/LEVEL)

Heliport records added to Source/Content and Used On paragraphs.

5.55 Airport Elevation (ELEV)

Title revised to Airport/Heliport Elevation (ELEV). Definition/Description, Source/Content and Used On revised to include Heliports.

5.66 Station Declination

Examples revised.

5.71 Name Field

Heliport records added to Used On.

5.72 Speed Limit

Heliport records added to Used On.

5.73 Speed Limit Altitude

Heliport records added to Used On.

5.92 Facility Elevation

Enroute Communications records added to Used On.

5.94 True Bearing

ILS records revised to read ILS Continuation records in Used On.

5.101 Communications Type

Enroute Communications records added to Source/Content table and Used On.

5.102 Radar

Enroute Communications records added to Source/Content table and Used On.

5.103 Communications Frequency

Section revised to include Enroute Communications records.

5.104 Modulation

Enroute Communications records added to Source/Content table and Used On.

5.105 Call Sign

Section revised to include Enroute Communications records.

5.106 Additional Service (ADDL SERVICE)

Title revised to Service Indicator (SER IND). Entire section revised.

5.108 IFR Capability (IFR)

Heliport records added to Definition/Description and Used On.

5.115 Direction Restriction

Source/Content revised with editorial correction.

5.116 FIR/UIR Identifier

Added text to Source/Content. Heliport records added to Used On.

5.117 FIR/UIR Indicator

Enroute Communications records added to Used On.

5.127 Maximum Altitude

Added new example.

5.130 Multiple Code

Source/Content revised.

5.151 FIR/UIR Address

Enroute Communications records added to Used On.

5.152 Start/End Indicator (S/E IND)

Heliport records added to Used On.

5.153 Start/End Date

Heliport records added to Used On.

The following Sections added by this Supplement:

5.176 Pad Dimensions

5.177 Public/Military Indicator (PUB/MIL)

5.178 Time Zone

5.179 Daylight Time Indicator (DAY TIME)

5.180 PAD Identifier (PAD IDENT)

5.181 H24 Indicator (H24)

5.182 Guard/Transmit (G/T)

5.183 Sectorization (SECTOR)

5.184 Communication Altitude (COMM ALTITUDE)

5.185 Associated Facility (ACCOS FAC)

5.186 Narrative

5.187 Distance Description (DIST DESC)

5.188 Communications Distance (COMM DIST)

5.189 Remote Site Name

5.190 FIR/RDO Identifier (FIR/RDO)

6.7 Labels

Add paragraph clarifying the use of the EOV label type.

6.9 Summary of Tape Data Layout

Add new section.

ATTACHMENT 2 - WAYPOINT IDENTIFIERS

Rule D.1.

Text added to define unnamed turn points, intersections and bearing/distance waypoints of distance equal to or greater than 100 nautical miles.

Rule D.3.

Reporting positions defined by coordinates paragraphs a. and b. revised.

ATTACHMENT 5 - PATH AND TERMINATOR GENERAL RULES

Rule B.

Table under Rule B revised to allow for IF ending leg for STAR Route Type 2, 5 or 8 if there is only one leg.

Rule C.

Table 1 - Leg Sequence

Revised due to the removal of the TI leg.

Rules O. through AB.

Inserted due to editorial omission in Supplement 7.

Table 2 - Leg Type Illustrations

Illustrations revised due to the removal of the TI leg.

Table 3 - Leg Data Fields

Revised due to the removal of the TI leg.

ATTACHMENT 5 - PATH AND TERMINATOR

APPROACHES AND APPROACH TRANSITIONS

Rule H.3.a.

Range for vertical angle revised to -3.00 through -3.77 degrees.

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SUPPLEMENT 9

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: March 2, 1990

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: October 26, 1989

A. PURPOSE OF THIS SUPPLEMENT

This Supplement incorporates the definition of Preferred Routes, LORAN based approach procedures and Non-Precision VOR based approach procedures into ARINC Specification 424. Changes to ARINC Specification 424 are also included to improve the operational utility of the navigation data base. New rules or clarifications to existing rules are provided by this Supplement.

B. ORGANIZATION OF THIS SUPPLEMENT

The first part of this Supplement printed on goldenrod colored paper, contains descriptions of the changes introduced into the Specification by this Supplement. The second part consists of replacement white pages for the Specification modified to reflect these changes. The modified and added material on each replacement page is identified with c-9 symbols in the margins.

Existing copies of Specification 424-8 may be updated by inserting the replacement pages where necessary and destroying the pages they displace. The goldenrod colored Supplement should be inserted inside the rear cover of the Specification following Supplement 8.

C. CHANGES TO ARINC SPECIFICATION 424 INTRODUCED BY THIS SUPPLEMENT

This Section presents a complete tabulation of the changes and additions to the Specification introduced by this Supplement. Each change is identified using the Section number and title that will be employed when the Supplement is incorporated. In each case there is included a brief description of the addition or change and, for other than very minor revisions, any text originally contained in the Specification is reproduced for reference.

1.1.2 Coverage of Flight Planning Needs

Add new section.

3.2.2.1 VHF NAVAID Section (D) - Subsection (D)

Statement paragraph revised.

3.2.2.2 Enroute NDB NAVAID Section (D) – Subsection (DB)

Statement paragraph revised.

3.2.4.6 Airport Approaches Section (P) - Subsection (PF)

Statement paragraph revised.

3.2.4.13 Airport Terminal NDB Section (P) - Subsection (PN)

Add new section.

3.2.10 Preferred Routes Section (E) - Subsection (ET)

Add new section.

4.2.1 Primary Record VHF NAVAIDS

Delete editorial text prior to record definition.

4.3 NDB NAVAID Record (DB)

Title revised to NDB NAVAID Record (DB or PN). Statement paragraph revised.

4.4 Waypoint Records (EA or PC)

Statement paragraph revised.

4.4.1 Primary Records

Revise Waypoint Record to add Name Format Identifier to the Primary records.

4.5 Holding Pattern Records (EP)

Statement paragraph revised.

4.5.1 Primary Records (EP)

Revise Holding Pattern Primary records to add Section/Subsection code in place of File Code. Delete File Code.

4.6.1 Primary Records (ER)

Revise Enroute Airway Primary records to add Section/Subsection code in place of File Code. Delete File Code.

4.8.2 Continuation Records

Revise Gate Continuation record. Editorial correction to length field.

4.9.1 Primary Records

Revise SID/STAR/Approach Primary records to add Section/Subsection code in place of File Code. Delete File Code.

4.9.2 SID/STAR/Approach Continuation Records

Add fields for encoding of LORAN data.

4.13 ILS Marker (PM)

Statement paragraph revised.

4.14.3 Additional Continuation Records

Add Airport Communication Additional Continuation record to permit use of Time of Operation field.

4.17.1 Primary Records

Revise the FIR/UIR record to change the FIR/UIR Address from 2 to 4 characters. Data contained after column 12 through 98 is moved 2 columns to accommodate the revision.

4.18.2 Continuation Records

Revise Restrictive Airspace Continuation record to permit use of Time of Operation field.

4.18.3 Flight Planning Continuation Record

Add Restrictive Airspace Flight Planning Continuation record to provide Start/End Indicator and Date for Time of Operation field contained in 4.18.2 Continuation Records.

4.20.1 Primary Records

Revise MSA (Minimum Sector Altitude) Primary records to add Section/Subsection code in place of File Code. Delete File Code.

4.21.1 Primary Records

Revise Enroute Airways Restriction Primary records to add Section/Subsection code in place of File Code. Delete File Code.

4.23 Enroute Communications Records (EV)

Revise FIR/UIR Address from 2 to 4 characters. Revise Remote Site Name length from 30 to 25 characters to accommodate the revision.

4.23.2 Continuation Records

Enroute Communications Continuation record revised for definition of Time of Operation.

4.23.3 Continuation Records

Enroute Communications Continuation record added for definition of Time of Operation.

4.25 Preferred Routes (ET)

Add new section.

4.25.1 Primary Records

Add new record.

4.25.2 Continuation Records

Add new record.

Table 4-1 ARINC 424-9 RECORD FORMAT

Table revised to reflect changes introduced in Supplement 9.

5.5 Subsection Code

Revise Definition/Description. Add Preferred Routes and Airport Terminal NDBs to table (i) Section and Subsection Encoding Scheme.

5.7 Route Type (RT TYPE)

Revise Definition/Description. Add Preferred Route Records (ET) table under Source/Content. Revise Approach Route Records (PF) table.

5.8 Route Identifier (ROUTE IDENT)

Section revised for accommodation of Preferred Routes.

5.9 SID/STAR Route Identifier (SID/STAR IDENT)

Revise Definition/Description to reference new Chapter 7.0 NAMING CONVENTIONS.

5.10 Approach Route Identifier (APPROACH IDENT)

Revise Source/Content and Examples for accommodation of Circling Approaches.

5.12 Sequence Number (SEQ NR)

Revise Length to add Preferred Routes.

5.15 File Code

The File Code is being removed from all records. Revise title to Intentionally left blank and delete remaining text.

5.17 Waypoint Description Code (DESC CODE)

Add Runway Centerline Fix entry to Table (iii) Waypoint Description Codes to add Non-Precision VOR based approach procedures.

5.18 Boundary Code (BDY CODE)

Revise South Pacific Area Boundary Code “I” to “1.”

5.19 Level (LEVEL)

Revise Used On to add Preferred Routes and Restrictive Airspace records.

5.23 Recommended Navaid (RECD NAV)

Revise section to add Non-Precision VOR based approach procedures.

5.26 Outbound Magnetic Course (OB MAG CRS)

Revise Definition/Description and Source/Content.

5.28 Inbound Magnetic Course (IB MAG CRS)

Revise Definition/Description and Source/Content.

5.29 Altitude Descript (ALT DESC)

Add “R” descriptor to Source/Content table to add encoding of Non-Precision VOR based procedures.

5.30 Altitude/Minimum Altitude

Revise Definition/Description, Source/Content and Used On to add Preferred Routes.

5.39 Magnetic Variation (MAG VAR)

Revise Source/Content to add records which are oriented to TRUE North.

5.43 Waypoint Name/Description (NAME/DESC)

Revise Source/Content to reference new Chapter 7.0 NAMING CONVENTIONS. Revise Examples.

5.47 Localizer Bearing (LOC BRG)

Revise Source/Content and Examples to add use of localizer courses charted with true courses.

5.58 Runway Magnetic Bearing (RWY BRG)

Revise Source/Content and Examples to add use of runway bearings charted with true bearings.

5.62 Inbound Holding Course (IB HOLD CRS)

Revise Source/Content and Examples to add use of holding courses charted with true bearings.

5.77 VIA

Revise section to add Preferred Routes.

5.78 SID/STAR/App/Awy (S/S/A/AWY)

Revise title to SID/STAR/App/Awy (S/S/A/AWY)
SID/STAR/Awy (S/S/AWY).

Revise section to add Preferred Routes.

5.83 To Fix

Revise section to add Preferred Routes.

5.106 Service Indicator (SER IND)

Revise title to Service Indicator (SERV IND). Delete Source/Content Airport Communications Records Terminal Control Area Group I and II coding.

5.114 Duplicate Identifier

Revise Source/Content and Examples to add Holding Pattern Types.

5.127 Maximum Altitude (MAX ALT)

Revise Used On to add Preferred Routes.

5.131 Time Code (TIME CD)

Revise to permit use of Time of Operation field.

5.138 Time Group

Revise Used On to include Restrictive Airspace Continuation and Preferred Route Continuation records only.

5.139 Time Group

The Time Group field is being replaced by Section 5.195 Time of Operation. Revise title to Intentionally left blank and delete remaining text.

5.151 FIR/UIR Address (ADDRESS)

Revise section to incorporate ICAO Document 8585 four character addressing scheme. Revised Used On to include Enroute Communications records.

5.189 Remote Site Name

Revise Length to 25 characters.

The following new Sections added by this Supplement:

5.191 Triad Stations (TRIAD STA)

5.192 Group Repetition Interval (GRI)

5.193 Additional Secondary Phase Factor (ASF)

5.194 Initial/Terminus Airport/Fix

5.195 Time of Operation

5.196 Name Format Indicator (NAME IND)

6.3 Bit Density

Revise text to add 6250 bits per inch bit density capability. Add text requiring external reel label to identify bit density used.

6.4 Coding

Revise text to permit encoding of data using American Standard Code for Information Interchange (ASCII) capability. Add text requiring external reel label to identify encoding standard used.

7.0 NAMING CONVENTIONS

Add new chapter.

ATTACHMENT 2 - WAYPOINT IDENTIFIERS

Revise title to ATTACHMENT 2 - INTENTIONALLY LEFT BLANK. Delete Attachment. Material previously contained in Attachment 2 is now located in Chapter 7.0 Naming Conventions.

ATTACHMENT 5 - PATH AND TERMINATOR GENERAL RULES

Revise the table under Rule B to permit "FM" and "VM" as an ending leg for STAR Runway Transition (Route Type 3, 6 or 9).

ATTACHMENT 5 - PATH AND TERMINATOR APPROACHES AND APPROACH TRANSITIONS

A. GENERAL

Revise Rule 2 for Circling Approaches.

Revise Rule 5 to clarify use of Approach Step-Down Fixes.

Add Rule 11 to permit use of ILS procedures for design of MLS approach.

Add Rule 12 for Non-Precision VOR based approaches.

B. VOR, VORDME, VORTAC AND TACAN Approach Procedure Coding

Add Rule 1.e for Non-Precision VOR based approaches.

Add Rule 1.f for Circling Approaches.

Add Rule 2.e for Non-Precision VOR based approaches.

Add Rule 2.f for Circling Approaches.

Revise Rule 3.a for Non-Precision VOR based approaches.

Add Rule 3.c for Circling Approaches.

C. RNAV and LORAN Approach Procedures Coding

Revise Section C to include LORAN approach procedures.

D. Localizer and Back Course Approach Procedure Coding

Revise Rule 5 to remove vertical limits. Specify only that a vertical angle will be contained in the last point in the final approach fix.

H. NDB Approach Procedure Coding

Add Rule 1.e for Non-Precision VOR based approaches.

Add Rule 1.f for Circling Approaches.

Add Rule 2.e for Non-Precision VOR based approaches.

Add Rule 2.f for Circling Approaches.

Revise Rule 3.a for Non-Precision VOR based approaches.

Add Rule 3.c for Circling Approaches.

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SUPPLEMENT 10

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: August 20, 1993

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: August 16, 1993

A . PURPOSE OF THIS DOCUMENT

This Supplement introduces changes to ARINC 424 to improve the operational utility of the navigation data base.

B. ORGANIZATION OF THIS DOCUMENT

The first part of this Supplement printed on goldenrod colored paper, contains descriptions of the changes introduced into the Specification by this Supplement. The second part consists of replacement white pages for the Specification modified to reflect these changes. The modified and added material on each replacement page is identified with c-10 symbols in the margins.

Existing copies of Specification 424-9 may be updated by inserting the replacement pages where necessary and destroying the pages they displace. The goldenrod colored Supplement should be inserted inside the rear cover of the Specification following Supplement 9.

C. CHANGES TO ARINC SPECIFICATION 424 INTRODUCED BY THIS SUPPLEMENT

This section presents a complete tabulation of the changes and additions to the Specification to be introduced by this Supplement. Each change or addition is defined by the section number and the title that will be employed when the Supplement is eventually incorporated. In each case a brief description of the change or addition is included.

2.2 Special Navigation Terms

Definition for Localizer added.

3.2.2.1 VHF NAVAID Section (D) - Subsection (D)

Section revised.

3.2.3.3 Enroute Holding Patterns Section (E) - Subsection (EP)

Section renamed Holding Patterns (E) - Subsection (EP). Section revised.

3.2.4.8 Airport ILS Section (P) - Subsection (PI)

Section renamed Airport Localizer Section (P) - Subsection (PI). Section revised.

3.2.4.10 Airport ILS Markers Section (P) - Subsection (PM)

Section renamed Airport Localizer Markers Section (P) - Subsection (PM). Section revised.

3.2.4.13 Airport Terminal NDB Section (P) - Subsection (PN)

Section revised.

4.2 VHF NAVAID Record (D)

Section revised.

4.2.1 Primary Records

Added Datum Code.

4.2.4 Flight Planning Continuation Records

Section revised.

4.3 NDB NAVAID Record

Section revised.

4.3.1 Primary Records

Added Datum Code.

4.3.4 Flight Planning Continuation Records

Section revised. FIR/UIR Identifier revised to FIR Identifier.

4.4.1 Primary Records

Added references to Note 1 and Note 2. Added Datum Code. Note 2 revised.

4.4.3 Flight Planning Continuation Records

Section revised.

4.5 Holding Pattern Records (EP)

Section revised.

4.5.1 Primary Records

Added ICAO Code following Region Code. Added references to Note 1. Added Note 1.

4.7.1 Primary Records

Added Magnetic/True Indicator and Datum Code.

4.7.3 Flight Planning Continuation Records

Section revised.

4.11 ILS (Localizer and Glide Slope) Records (PI)

Section renamed Localizer and Glide Slope Records (PI). Section revised.

4.11.2 Continuation Records

Removed Note (i). Renamed Note (ii) to Note (i).

4.13 ILS Marker (PM)

Section renamed Localizer Marker (PM). Section revised.

4.14.1 Primary Records

Added Frequency Units, Signal Emission, Sector Facility, Remote Facility, ICAO Code, Section Code and Subsection Code. Revised Call Sign length.

4.15.1 Primary Records

Added Datum Code.

4.17 FIR/UIR Records (UF)

Section Revised.

4.17.1 Primary Records

Editorial corrections.

4.20.1 Primary Records

Added Magnetic/True Indicator.

4.21 Enroute Airways Restriction Records (EU)

Section revised.

4.21.1 Primary Records

Added provisions for new Enroute Airways Restriction Record types.

4.21.1 AAltitude Exclusion Record (AE)

Added new record.

4.21.2 AAE Continuation Records

Added new record.

4.21.1B Note Restriction Record (NR)

Added new record.

4.21.2B NR Continuation Record

Added new record.

4.21.1C Seasonal Closure Record (SC)

Added new record.

4.21.1D Cruising Table Replacement Record (TC)

Added new record.

4.21.2D TC Continuation Record

Added new record.

4.21.3 Continuation Records

Record removed.

4.23.1 Primary Records

Added Frequency Units and Signal Emission. Renamed Associated Facility to Remote Facility.

4.24.1 Primary Records

Added Datum Code and Magnetic/True Indicator.

4.26 Heliport Communiations Records (HV)

Added new record and associated continuation records.

Table 4-1 ARINC 424-10 RECORD FORMAT

Table revised to reflect changes introduced in Supplement 10.

5.1 General

Section revised.

5.3 Customer/Area Code (CUST/AREA)

Section revised.

5.5 Subsection Code

Section revised.

5.6 Airport/Heliport Identifier (ARPT/HELI IDENT)

Section revised.

5.7 Route Type (RT TYPE)

Section revised.

5.11 Transition Identifier (TRANS IDENT)

Section revised.

5.13 Fix Identifier (FIX IDENT)

Section revised.

5.14 ICAO Code (ICAO CODE)

Section revised.

5.16 Continuation Record Number (CONT NR)

Section revised.

5.20 Turn Direction (TURN DIR)

Section revised.

5.27 Route Distance From, Holding Distance/Time (RTE DIST FROM, HOLD DIST/TIME)

Section revised.

5.29 Altitude Descript (ATL DESC)

Section revised.

5.30 Altitude/Minimum Altitude

Section revised.

5.33 VOR/NDB Identifier (VOR IDENT/NDB IDENT)

Section revised.

5.34 VOR/NDB Frequency (VOR/NDB FREQ)

Section revised.

5.35 NAVAID Class (CLASS)

Section revised.

5.37 Longitude (LONGITUDE)

Section revised.

5.38 DME Identifier (DME IDENT)

Section revised.

5.39 Magnetic Variation (MAG VAR)

Section revised.

5.41 Region Code (REGN CODE)

Section revised.

5.42 Waypoint Type (TYPE)

Section revised.

5.46 Runway Identifier (RUNWAY IDENT)

Section revised.

5.69 Threshold Displacement Distance (DSPLCD THR)

Section revised.

5.72 Speed Limit (SPEED LIMIT)

Section revised.

5.77 VIA Code

Section revised.

5.83 To FIX

Section revised.

5.90 ILS/DME Bias

Section revised.

5.99 Marker Type (MKR TYPE)

Section revised.

5.100 Minor Axis Bearing (MINOR AXIS TRUE BRG)

Section revised.

5.101 Communications Type (COMM TYPE)

Section revised.

5.102 Radar (RADAR)

Section revised.

5.103 Communications Frequency (COMM FREQ)

Section revised.

5.104 Modulation (MODLN)

Section renamed Frequency Units (FREQ UNIT). Section revised.

5.105 Call Sign (CALL SIGN)

Section revised.

5.106 Service Indicator (SERV IND)

Section revised.

5.114 Duplicate Indicator (DUP IND)

Section revised.

5.116 FIR/UIR Identifier (FIR/UIR IDENT)

Section revised.

5.131 Time Code (TIME CD)

Section revised.

5.137 Vertical Separation

Section revised.

5.138 Time Indicator (TIME IND)

Section revised.

5.144 MSA Center

Section revised.

5.151 FIR/UIR Address (ADDRESS)

Section revised.

5.155 Airway Restriction Note Indicator (NOTE IND)

Section removed.

5.156 Active Indicator (ACT IND)

Section removed.

5.157 Airway Restriction Start/End Date (START/END DATE)

Section revised.

5.158 Airway Restriction Start/End Time (START/END TIME)

Section removed.

5.159 Weekly Frequency (WEEKLY FREQ)

Section removed.

5.165 Magnetic/True Indicator (M/T IND)

Section revised.

5.167 MLS Azimuth Bearing (MLS AZ BRG)

Section revised.

5.172 Azimuth Coverage Sector (Right/Left) (AZ COV RIGHT/LEFT)

Back Azimuth Coverage Sector (Right/Left) (BAZ COV RIGHT/LEFT)

Editorial correction.

5.178 Time Zone

Section revised.

5.185 Associated Facility (ACCOS FAC)

Section renamed Sector Facility (SEC FAC). Section revised.

5.187 Distance Description (DIST DESC)

Section revised.

5.188 Communications Distance (COMM DIST)

Section revised.

5.191 Triad Stations (TRIAD STA)

Section revised.

5.192 Group Repitition Interval (GRI)

Section revised.

5.193 Additional Secondary Phase Factor (ASF)

Section revised.

5.194 Initial/Terminus Airport/Fix

Section revised.

5.197 Datum Code (DATUM)

Added section.

5.198 Modulation (MODULN)

Added section.

5.199 Signal Emission (SIG EM)

Added section.

5.200 Remote Facility (REM FAC)

Added section.

5.201 Restriction Record Type (REST TYPE)

Added section.

5.202 Exclusion Indicator (EXC IND)

Added section.

5.203 Block Indicator (BLOCK IND)

Added section.

Figure 5-6 Company Route Record (R) Field Content

Renamed Figure 5-7.

6.1 General

Section revised.

6.2 Number of Tape Tracks

Section revised.

6.5 Parity Convention

Section revised.

6.6 Reel-File Relationship

Section revised.

6.7.1 Volume Header Label (VOL)

Section revised.

6.9.1 One File, One Reel

Added section.

6.9.2 One File, Multiple Reels

Added section.

6.9.3 Multiple Files, One Reel

Added section.

7.2.6 Terminal Waypoints

Section revised.

7.4 SID/STAR Procedure Identifiers

Section revised.

7.6 Transition Identifiers

Added section.

ATTACHMENT 2 - LOCAL HORIZONTAL REFERENCE DATUM NAME, DATUM CODE AND ELLIPSOID LIST

Added attachment.

ATTACHMENT 3 - NAVIGATION CHART/FILE DATA RELATIONSHIP

Charts removed. Attachment revised to reflect changes introduced in Supplement 10.

ATTACHMENT 4 - AIRWAY MINIMUM ALTITUDES

Attachment revised.

ATTACHMENT 5 - PATH AND TERMINATOR

Attachment revised.

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SUPPLEMENT 11

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: August 20, 1993

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: August 16, 1993

A. PURPOSE OF THIS DOCUMENT

This Supplement introduces changes necessary to implement curved path approaches.

B. ORGANIZATION OF THIS DOCUMENT

The first part of this Supplement printed on goldenrod colored paper, contains descriptions of the changes introduced into the Specification by this Supplement. The second part consists of replacement white pages for the Specification modified to reflect these changes. The modified and added material on each replacement page is identified with c-11 symbols in the margins.

Existing copies of Specification 424-9 (Supplement 10 changes are being added simultaneously) may be updated by inserting the replacement pages where necessary and destroying the pages they displace. The goldenrod colored Supplement should be inserted inside the rear cover of the Specification following Supplement 9.

C. CHANGES TO SPECIFICATION 424 INTRODUCED BY THIS SUPPLEMENT

This section presents a complete tabulation of the changes and additions to the Specification to be introduced by this Supplement. Each change or addition is defined by the section number and the title that will be employed when the Supplement is eventually incorporated. In each case a brief description of the change or addition is included.

2.2 Special Navigation Terms

Definition for Precision ARC added.

4.9 SID/STAR/Approach (PD, PE and PF)

Section revised.

4.9.1 Primary Records

Added ARC Radius. Revised MSA Center to Center Fix.

5.24 Theta (THETA)

Section revised.

5.25 Rho (RHO)

Section revised.

5.26 Outbound Magnetic Course

Section revised.

5.27 Route Distance From, Holding Distance Time (RTE DIST HOLD DIST/TIME)

Section Revised.

5.42 Waypoint Type (TYPE)

Section Revised.

5.144 MSA Center

Section renamed Center Fix (CENTER FIX). Section revised.

5.204 ARC Radius (ARC RAD)

Added section.

7.2.6.d Terminal Waypoints

Added section.

ATTACHMENT 5 PATH AND TERMINATION

Section revised.

1.3 Leg Sequencing

Section revised. Added "RF" leg type.

1.4 Leg Type Description

Added RF Leg Type.

1.5 Leg Data Fields

Section revised. Table revised.

3.0 PATH AND TERMINATOR RELATED RULES VALID FOR ALL PROCEDURE TYPES

Added rules.

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SUPPLEMENT 12

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: September 15, 1994

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: May 17, 1994

A. PURPOSE OF THIS DOCUMENT

This Supplement introduces changes to ARINC Specification 424 to improve the operational utility of the navigation data base.

B. ORGANIZATION OF THIS DOCUMENT

The first part of this Supplement printed on goldenrod colored paper, contains descriptions of the changes introduced into the Specification by this Supplement. The second part consists of replacement white pages for the Specification modified to reflect these changes. The modified and added material on each replacement page is identified with c-12 symbols in the margins.

Existing copies of Specification 424-11 may be updated by inserting the replacement pages where necessary and destroying the pages they displace. The goldenrod colored Supplement should be inserted inside the rear cover of the Specification following Supplement 11.

C. CHANGES TO ARINC SPECIFICATION 424 INTRODUCED BY THIS DRAFT SUPPLEMENT

This section presents a complete tabulation of the changes and additions to the Specification to be introduced by this Supplement. Each change or addition is defined by the section number and the title that will be employed when the Supplement is eventually incorporated. In each case a brief description of the change or addition is included.

2.2 Special Navigation Terms

This section is revised to add definitions for Initial Approach Fix, Intermediate Approach Fix, Gateway Fix and Precision Final Approach Fix. In the addition, the definitions for Final Approach Course Fix and Final Approach Fix have been revised.

4.2.6 Limitation Continuation Record

This record is added to code signal limitations of VHF Navaids.

4.9 SID/STAR/Approach (PD, PE and PF)

This record is revised to add provisions for RNP, and to identity Recommended Navaid Section and Subsection.

4.11.3 Localizer Simulation Continuation Record

This record is revised to add Approach Route Identifier.

5.6 Airport/Heliport Identifier (ARPT IDENT) (HEL IDENT)

This section is revised to provide for coding where no officially published ICAO code is available.

5.7 Route Type

This section is revised to add additional SID, STAR and Approach route types.

5.10 Approach Route Identifier

This section is revised to add the capability for coding of multiple approach procedures.

5.12 Sequence Number (SEQ NR)

This section is revised to support the new VHF Navaid Limitation Continuation record.

5.17 Waypoint Description Code

This section is revised to add additional waypoint types.

5.23 Recommended NAVAID (RECD NAV)

This section is revised based on the Navaid type.

5.24 Theta

This section is revised based on the Recommended Navaid.

5.25 Rho (RHO)

This section is revised based on the Recommended Navaid.

5.26 Outbound Magnetic Course

This section is revised to reflect changes in the coding rules.

5.29 Altitude Description

This section is revised to support the new VHF Navaid Limitation Continuation record.

5.39 Magnetic Variation

This section is revised to support Epoch Year Variation.

5.42 Waypoint Type

This section is revised to add additional enroute and terminal waypoints.

5.70 Vertical Angle (VERT ANGLE)

This section, along with Figure 5-11, is revised to reflect changes in the coding rules.

5.74 Glide Slope Elevation (G.S. ELEV), EL Elevation (EL ELEV)

This section has been renamed Component Elevation (G.S. ELEV, EL ELEV, AZ ELEV, BAZ ELEV). The text has been revised for MLS coding.

5.187 Distance Description

This section is revised to support the new VHF Navaid Limitation Continuation record.

5.205 Navaid Limitation Code

This section is added to support the new VHF Navaid Limitation Continuation record.

5.206 Component Affected Indicator

This section is added to support the new VHF Navaid Limitation Continuation record.

5.207 Sector From/Sector To

This section is added to support the new VHF Navaid Limitation Continuation record.

5.208 Distance Limitation

This section is added to support the new VHF Navaid Limitation Continuation record.

5.209 Altitude Limitation (ALT LIMIT)

This section is added to support the new VHF Navaid Limitation Continuation record.

5.210 Sequence End Indicator (SEQ END)

This section is added to support the new VHF Navaid Limitation Continuation record.

7.2.6.a Terminal Waypoints

This is is revised to add FMS, GPS,. Heliport, NDB CTL and MLS approach types.

ATTACHMENT 2 - LOCAL HORIZONTAL REFERENCE DATUM NAME, DATUM CODE AND ELLIPSOID LIST

This section is revised to add additional datum.

ATTACHMENT 5 - PATH AND TERMINATION

1.2 Beginning and Ending Leg Type

This section is revised to allow FMS and GPS Approach Procedures. In addition, the use of TF legs is expanded to allow coding for final approach segments.

1.3 Leg Sequencing

This section is revised to allow leg DF-DF, IF-HA, IF-HM and IF-PI leg combinations

3.0 Path and Termination Related Rules Valid for Al Procedure Types

This section is revised to allow DF-DF leg types.

4.0 Standard Instrument Departure (SID) Coding Rules

This section is revised to prevent unanticipated turns on departure.

6.0 Approach Procedure Rules Valid for All Procedure Types

This section is revised to add the coding of FMS, GPS, and MLS. In addition, revisions are introduced to add TF legs.

APPENDIX 2 - SUBJECT INDEX

This appendix is added to facilitate easier use of ARINC Specification 424.

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SUPPLEMENT 13

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: December 31, 1995

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: May 23, 1995

A. PURPOSE OF THIS DOCUMENT

This Supplement introduces changes to ARINC Specification 424 to improve the operational utility of the navigation data base.

B. ORGANIZATION OF THIS DOCUMENT

This Supplement introduces a major rework of ARINC Specification 424. The normal practice of publishing a separate supplement to update the existing document has not been followed. The extensiveness of the changes introduced by Supplement 13 has resulted in the impracticality of producing a separate set of replacement pages. Supplement 13 is therefore available only as an integral part of ARINC Specification 424-13. The modified and added material on each page is identified with c-13 symbols in the margins.

C. CHANGES TO ARINC SPECIFICATION 424 INTRODUCED BY THIS SUPPLEMENT

This section presents a complete tabulation of the changes and additions to the Specification to be introduced by this Supplement. Each change or addition is defined by the section number and the title. In each case a brief description of the change or addition is included.

2.2 Special Navigation Terms

This section is revised to add the definition for Phantom Waypoint.

3.2.7 Tables Section (T)

This section was previously titled Cruising Table Section (T) - Subsection (TC). Sections 3.7.2.1 and 3.7.2.2 have been added to identify previously include cruising table information and added geographical reference table information.

4.6 Enroute Airway Records (ER)

This section is revised to add provisions for Required Navigation Performance (RNP). Note 1 is revised to describe the use of Column 19 for ATS Route Service.

4.7 Airport Records (PA)

4.7.3 Flight Planning Continuation Records

This section is revised to add an indication if the airport defined in the Primary Record is associated with Controlled Airspace.

4.10 Runway Records (PG)

This section is revised to add runway gradient. In addition, to support MLS, Localizer is revised to Localizer/MLS. The record now permits the coding of a second Localizer/MLS.

4.24 Heliport Records (HA)

4.24.3 Flight Planning Continuation Records

This section is revised to add an indication if the airport defined in the Primary Record is associated with Controlled Airspace.

4.25 Preferred Route Record (ET)

This section is revised to permit expansion of the Route Identifier beyond five characters. In addition, fields are added to support Aircraft Use Group, Direction Restriction and Altitude Description.

4.25.3 Continuation Record (ET)

This section is added to support the Preferred Route Record Continuation Record.

4.27 Controlled Airspace Records (UC)

This section is added to support the encoding of controlled airspace.

4.28 Geographical Reference Tables (TG)

This section is added to support Preferred Routes.

5.3 Customer/Area Code (CUST/AREA)

This section is revised so that Preferred Route Records and Geographical Reference Table Records are indicated as having no area code.

5.5 Subsection Code

This section is revised to include the new Controlled Airspace Record.

5.6 Airport/Heliport Identifier (ARPT/HELI IDENT)

This section is revised to support non-officially published identifiers.

5.7 Route Type (RT TYPE)

This section is revised so that Preferred Route Records have an expanded Route Type capability and SID Route Types are presented in the correct order.

5.8 Route Identifier

This section is revised to expand the Preferred Route Records to 10 characters. Six characters were defined in previous versions of this Specification.

5.10 Approach Route Identifier (APPROACH IDENT)

This section is revised to support Helicopter Approach Procedures.

5.11 Transition Identifier (TRANS IDENT)

This section is revised to support RNAV SID, FMS SID, RNAV STAR and FMS STAR route types.

5.12 Sequence Number (SEQ NR)

This section is revised to support Controlled Airspace and Geographical Reference Table records.

5.17 Waypoint Description Code (WAY DESC)

This section is completely revised.

5.19 Level (LEVEL)

This section is revised to support Controlled Airspace Records.

5.23 Recommended Navaid (RECD NAV)

This section is revised to support Un-Biased ILSDME and Localizer Markers.

5.29 Altitude Description (ALT DESC)

This section is revised to support Preferred Route Records.

5.30 Altitude/Minimum Altitude

This section is revised to describe the application of minimum and maximum altitude as it relates to Preferred Route Records.

5.36 Latitude (LATITUDE)

This section is revised to include Controlled Airspace Records.

5.37 Longitude (LONGITUDE)

This section is revised to include Controlled Airspace Records.

5.42 Waypoint Type (TYPE)

This section is revised to add the arc center fix waypoint to the Terminal Waypoints table.

5.44 Localizer/MLS Identifier (LOC IDENT), (MLS IDENT)

This section is revised to encode multiple localizers associated with a single runway.

5.77 VIA Code

This section is revised to provide Preferred Route Records with two new fix related capabilities.

5.80 Localizer/MLS Category/Classification (CAT/CLASS)

This section was previously titled ILS Category. This section is completely revised.

5.115 Direction Restriction

This section is revised to support Preferred Route Records.

5.118 Boundary VIA

This section is revised to add application rules and to provide support for the Controlled Airspace Record. Figure 5-12 Controlled and Restrictive Airspace and FIR/UIR Boundaries is completely revised.

5.119 Arc Distance (ARC DIST)

This section is revised to support Controlled Airspace Records.

5.120 Arc Bearing (ARC BRG)

This section is revised to support Controlled Airspace Records.

5.121 Lower/Upper Limit

This section is revised to support Controlled Airspace Records.

5.130 Multiple Code (MULTI CD)

This section is revised to support Controlled Airspace Records.

5.131 Time Code (TIME CD)

This section is revised to support Controlled Airspace Records.

5.132 NOTAM

This section is revised to support Controlled Airspace Records.

5.133 Unit Indicator (UNIT IND)

This section is revised to support Controlled Airspace Records.

5.138 Time Indicator (TIME IND)

This section is revised to support Controlled Airspace Records.

5.140 Controlling Agency

This section is revised to support Controlled Airspace Records.

5.149 Figure of Merit (MERIT)

This section is revised to add range values to the descriptions and to designate out of service VHF NAVAIDS.

5.195 Time of Operation (TIME OF OPERATION)

This section is revised to support Controlled Airspace Records.

5.211 Required Navigation Performance (RNP)

This section is added to provide provision for support of RNP.

5.212 Runway Gradient (RWY GRAD)

This section is added to support Runway records.

5.213 Controlled Airspace Type (ARSP TYPE)

This section is added to support Controlled Airspace records.

5.214 Controlled Airspace Center (ARSP CNTR)

This section is added to support Controlled Airspace records.

5.215 Controlled Airspace Classification (ARSP CLASS)

This section is added to support Controlled Airspace records.

5.216 Controlled Airspace Name (ARSP NAME)

This section is added to support Controlled Airspace records.

5.217 Controlled Airspace Indicator (CTLD ARSP IND)

This section is added to support Airport Flight Planning Continuation records.

5.218 Geographical Reference Table Identifier (GEO REF TBL ID)

This section is added to support Geographical Reference Table records.

5.219 Geographical Entity (GEO ENT)

This section is added to support Geographical Reference Table records.

5.220 Preferred Route Use Indicator (ET IND)

This section is added to support Preferred Route and Geographical Reference Table Records.

5.221 Aircraft Use Group (ACFT USE GP)

This section is added to support Preferred Route records.

7.5 Preferred Route Identifiers

This section is completely revised to clearly define and expand the naming conventions.

ATTACHMENT 5 - PATH AND TERMINATION

1.2 Beginning and Ending Leg Type

This section is revised to allow FMS and GPS approach procedures.

1.3 Leg Sequencing

This section is revised to allow the leg IF/RF combination.

3.0 Path and Termination Related Rules Valid for All Procedure Types

This section is revised to add rules for RF legs and Phantom Waypoints.

5.0 Standard Terminal Arrival Route (STAR) Coding Rules

This section is revised to add a rule for Expect Altitudes.

6.0 Approach Procedure Rules Valid for All Procedure Types

This section is revised to includes a number of proposals to modify the Approach Procedure Coding.

7.0 Missed Approach Procedure Rules Valid for All Procedure Types

This section is revised to includes a number of proposals to modify the Missed Approach Procedure Rules.

APPENDIX 2 - STRAIGHT-IN CRITERIA

This appendix is added using material previously contained in Attachment 5, Sections 6.2.7 and 6.2.8.

APPENDIX 3 - SUBJECT INDEX

Previously Appendix 2, this appendix is renumbered Appendix 3.

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SUPPLEMENT 14

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: February 11, 2000

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: August 25, 1999

A. PURPOSE OF THIS SUPPLEMENT

This Supplement introduces revisions and additions to the body and Attachments of ARINC Specification 424. These changes include revisions to Path Point Concept, GLS Record, and DGPS Record and Modification to Paths and Terminators.

B. ORGANIZATION OF THIS DOCUMENT

The material in Supplement 14 is integrated into ARINC Specification 424 to form an updated version of the standard.

The changes introduced by Supplement 14 have been identified using change bars and are labeled in the margin by a “c-14” indicator.

C. CHANGES TO SPECIFICATION 424 INTRODUCED BY THIS SUPPLEMENT

This section presents a complete tabulation of the changes and additions to the Specification introduced by this Supplement. Each change or addition is defined by the section number and the title that will be employed. In each case a brief description of the change or addition is included.

1.3.1 Coverage of Helicopter Operation Needs

New section was added.

2.2 Special Navigation

The Final Approach Course Fix definition was revised.

The “Final End Point definition” was added.

2.3 Precision RNAV Terms

This section was added.

ALL TITLES IN SECTIONS 3 WERE MODIFIED TO ONE-LETTER CHARACTERS IN THE SUBSECTIONS

3.1 User File Organization

The second paragraph was added by Supplement 14.

3.2.1 General

Last sentence in first paragraph was modified for clarity.

3.2.2.1 VHF Navaid Section (D), Subsection (blank)

Sections 3.3.5, 3.3.6, 3.3.7, and 3.3.8 were added.

3.2.2.2 NDB Navaid Section (D), Subsection (B)

Sections 3.2.10, 3.3.5, 3.3.6, 3.3.7 and 3.3.8 were added.

3.2.3.1 Enroute Waypoint Section (E), Subsection (A)

Sections 3.2.10, 3.3.5, 3.3.6, and 3.3.7 were added.

3.2.3.5 Enroute Airways Restriction Section (E), Subsection (U)

The Text was revised to be consistent with Section 3.2.3.6.

3.2.4.2 Airport Gates Section (P), Subsection (B)

This section was expanded to include Standard data for airport gates.

3.2.4.6 Airport Approaches Section (P), Subsection (F)

Text was added for clarification.

3.2.4.8 Airport And Heliport Localizer/Glide Slope Section (P), Subsection (I)

This section was revised to support Heliport records.

3.2.4.9 Airport and Heliport MLS Section (P), Subsection (L)

This section was revised to support Heliport records.

3.2.4.10 Airport and Heliport Marker/ Locator Section (P), Subsection (M)

This section was revised to support Heliport records.

3.2.4.13 Airport and Heliport Terminal NBD Section(P), Subsection (N)

Section 3.3.5, 3.3.6, 3.3.7, and 3.3.8 were added to support Heliport records.

3.2.4.14 Airport and Heliport Path Point Section (P), Subsection (P)

This section was added.

3.2.4.15 Flight Planning Arrival / Departure Data Record Section (P), Subsection (R)

This section was added.

3.2.4.16 GNSS Landing System (GLS) Section (P), Subsection (T)

This section was added.

3.2.5 Company Route and Alternation Destination Section (R)

The title was revised to “Company Route and Alternation Destination Section (R).”

3.2.5.1 Company Route Section (R) Subsection (Blank)

The text was revised to support Alternate Destination Record.

3.2.5.2 The Alternate Record Section (R) Subsection (A)

This Section was added to support Alternate Destination Records.

3.2.6.2 FIR/UIR Section (U), Subsection (F)

Existing text was modified for clarity.

3.2.6.3 Controlled Airspace Section (U), Subsection (C)

This section was added.

3.2.7.2 Geographical Reference Table Section (T), Subsection (G)

The reference to Section 3.3.10 was revised to 3.2.9.

3.2.9 Preferred Routes Section (E), Subsection (T)

This section was numbered 3.2.10 prior to 424-14. It was renumbered without change when the former 3.2.9, Heliport Section was moved to the Master Helicopter User File Section 3.3.

3.3 Master Helicopter User File Content

This section was added.

3.3.1 General

This section was added.

3.3.2 Jointly and Specifically used Section / Subsection

This section was added.

3.3.3 Heliport Section (H), Subsection (A)

This section was added.

3.3.4 Heliport Terminal Waypoints Section (H), Subsection (C)

This section was added.

3.3.5 Heliport Standard Instrument Departures (SIDs) Section (H), Subsection (D)

This section was added.

3.3.6 Heliport Standard Terminal Arrival Routes (STARs) Section (H), Subsection (E)

This section was added.

3.3.7 Heliport Approaches Section (H), Subsection (F)

This section was added.

3.3.8 Heliport MSA Section (H), Subsection (S)

This section was added.

3.3.9 Heliport Communications Section (H), Subsection (V)

This section was added.

SECTION 4 HAS BEEN RENUMBERED TO ACCOMMODATE THE INTRODUCTION OF ROTOR-WING RECORDS

4.0.1 General

Was numbered 4.1 prior to 424 -14.

Descriptive paragraph was revised to include Helicopter user file.

4.1 Master Airline User File

This section title added.

4.1.2 VHF NAVAID Record (D)

Was numbered 4.2 prior to 424.14.

4.1.2.1 VHF NAVAID Primary Records

Was numbered 4.2.1 prior to 424-14.

4.1.2.2 VHF NAVAID Continuation Records

Was numbered 4.2.2 prior to 424-14.

4.1.2.3 VHF NAVAID Simulation Continuation Records

Was numbered 4.2.3 prior to 424-14.

4.1.2.4 VHF NAVAID Flight Planning Continuation Records

Was numbered 4.2.4 prior to 424-14.

4.1.2.5 VHF NAVAID Flight Planning Continuation Records

Was numbered 4.2.5 prior to 424-14.

4.1.2.6 VHF NAVAID Limitation Continuation Records

Was numbered 4.2.6 prior to 424-14.

4.1.3 NDB NAVAID Record (DB) or (PN)

Was numbered 4.3 prior to 424-14.

4.1.3.1 NDB NAVAID Primary Records

Was numbered 4.3.1 prior to 424-14.

4.1.3.2 NDB NAVAID Continuation Records

Was numbered 4.3.2 prior to 424-14.

4.1.3.3 NDB NAVAID Simulation Continuation Records

Was numbered 4.3.3 prior to 424-14.

4.1.3.4 NDB NAVAID Flight Planning Continuation Records

Was numbered 4.3.4 prior to 424-14.

4.1.3.5 NDB NAVAID Flight Planning Continuation Records

Was numbered 4.3.5 prior to 424-14.

4.1.4 Waypoint Record (EA) or (PC)

Was numbered 4.4 prior to 424-14.

Text was added to support Helicopter Enroute and Terminal Waypoints

4.1.4.1 Waypoint Primary Records

Was numbered 4.4.1 prior to 424-14.

Text was added to support Helicopter Records.

4.1.4.2 Waypoint Continuation Records

Was numbered 4.4.2 prior to 424-14.

4.1.4.3 Waypoint Flight Planning Continuation Records

Was numbered 4.4.3 prior to 424-14.

4.1.4.4 Waypoint Flight Planning Continuation Records

Was numbered 4.4.4 prior to 424-14.

4.1.5 Holding Pattern Records (EP)

Was numbered 4.5 prior to 424-14.

4.1.5.1 Holding Pattern Primary Records

Was numbered 4.5.1 prior to 424-14.

Note 1 was revised to support Helicopter Records.

4.1.5.2 Holding Pattern Continuation Records

Was numbered 4.5.2 prior to 424-14.

4.1.6 Enroute Airway Records (ER)

Was numbered 4.6 prior to 424-14.

Text was added to support Helicopter Records.

4.1.6.1 Enroute Airways Primary Records

Was numbered 4.6.1 prior to 424-14.

4.1.6.2 Enroute Airways Continuation Records

Was numbered 4.6.2 prior to 424-14.

4.1.6.3 Enroute Airways Flight Planning Continuation Records

Was numbered 4.6.3 prior to 424-14.

4.1.6.4 Enroute Airways Flight Planning Continuation Records

Was numbered 4.6.4 prior to 424-14.

4.1.7 Airport Records (PA)

Was numbered 4.7 prior to 424-14.

4.1.7.1 Airport Primary Records

Was numbered 4.7.1 prior to 424-14 and the title was changed to “Airport Primary Records.”

Columns 32 and 69 through 132 were revised.

4.1.7.2 Airport Continuation Records

Was numbered 4.7.2 prior to 424-14 and the title was changed to “Airport Continuation Records.”

4.1.7.3 Airport Flight Planning Continuation Records

Was numbered 4.7.3 prior to 424-14 and the title was changed to “Airport Flight Planning Continuation Records.”

4.1.7.4 Airport Flight Planning Continuation Records

Was numbered 4.7.4 prior to 424-14 and the title was changed to “Airport Flight Planning Continuation Records.”

4.1.8 Airport Gate Records (PB)

Was numbered 4.8 prior to 424-14 and the title was changed to “Airport Gate Records (PB).”

4.1.8.1 Airport Gate Primary Records

Was numbered 4.8.1 prior to 424-14 and the title was changed to “Airport Gate Primary Records.”

4.1.8.2 Airport Gate Continuation Records

Was numbered 4.8.2 prior to 424-14 and the title was changed to “Airport Gate Continuation Records.”

4.1.9 Airport SID/STAR/APPROACH Records (PD, PE, and PF)

Was numbered 4.9 prior to 424-14 and the title was changed to “Airport SID/STAR/APPROACH Records PD, PE, and PF).

4.1.9.1 SID/STAR/Approach Primary Records

Was numbered 4.9.1 prior to 424-14.

Columns 117 through 123 were revised.

Notes 1 and 2 were added.

4.1.9.2 Airport SID/STAR/APPROACH Continuation Records

Was numbered 4.9.2 prior to 424-14 and the title was changed to “Airport SID/STAR/APPROACH Continuation Records.”

Columns 73 through 132 were revised.

Notes 1, 2 and 3 were added.

4.1.9.3 Airport SID/STAR/APPROACH Flight Planning Continuation Records

Was numbered 4.9.3 prior to 424-14 and the title was changed to "Airport SID/STAR/APPROACH Flight Planning Continuation Records."

4.1.9.4 Airport SID/STAR/APPROACH Flight Planning Continuation Records

Was numbered 4.9.4 prior to 424-14 and the title was changed to "Airport SID/STAR/APPROACH Flight Planning Continuation Records."

4.1.10 Runway Records (PG)

Was numbered 4.10 prior to 424-14.

4.1.10.1 Runway Primary Records

Was numbered 4.10.1 prior to 424-14 and the title was changed to "Runway Primary Records."

Section was revised to support GLS records.

4.1.10.2 Runway Continuation Records

Was numbered 4.10.2 prior to 424-14 and the title was changed to "Runway Continuation Records."

4.1.10.3 Runway Simulation Continuation Records

Was numbered 4.10.3 prior to 424-14 and the title was changed to "Runway Simulation Continuation Records."

4.1.11 Airport and Heliport Localizer and Glide Slope Records (PI)

Was numbered 4.11 prior to 424-14 and the title was changed to "Airport and Heliport Localizer and Glide Slope Records (PI)."

4.1.11.1 Airport and Heliport Localizer and Glide Slope Primary Records

Was numbered 4.11.1 prior to 424-14 and the title was changed to "Airport and Heliport Localizer and Glide Slope Primary Records."

4.1.11.2 Airport and Heliport Localizer and Glide Slope Continuation Records

Was numbered 4.11.2 prior to 424-14 and the title was changed to "Airport and Heliport Localizer and Glide Slope Continuation Records."

4.1.11.3 Airport and Heliport Localizer and Glide Slope Simulation Continuation Records

Was numbered 4.11.3 prior to 424-14 and the title was changed to "Airport and Heliport Localizer and Glide Slope Simulation Continuation Records."

4.1.12 Company Route Records (R)

Was numbered 4.12 prior to 424-14.

4.1.13 Airport and Heliport Localizer Marker Records(PM)

Was numbered 4.13 prior to 424-14 and the title was changed to "Airport and Heliport Localizer Marker Records(PM)."

4.1.13.1 Airport and Heliport Localizer Marker Primary Records

Was numbered 4.13.1 prior to 424-14 and the title was changed to "Airport and Heliport Localizer Marker Primary Records."

4.1.14 Airport Communications Records (PV)

Was numbered 4.14 prior to 424-14.

4.1.14.1 Airport Communications Primary Records

Was numbered 4.14.1 prior to 424-14 and the title was changed to "Airport Communications Primary Records."

4.1.14.2 Airport Communications Continuation Records

Was numbered 4.14.2 prior to 424-14 and the title was changed to "Airport Communications Continuation Records."

4.1.14.3 Airport Additional Communications Continuation Records

Was numbered 4.14.3 prior to 424-14 and the title was changed to "Airport Additional Communications Continuation Records."

4.1.15 Airways Marker Records (EM)

Was numbered 4.15 prior to 424-14.

4.1.15.1 Airways Marker Primary Records

Was numbered 4.15.1 prior to 424-14 and the title was changed to "Airways Marker Primary Records."

4.1.16 Cruising Tables Records (TC)

Was numbered 4.16 prior to 424-14.

4.1.16.1 Cruising Tables Primary Records

Was numbered 4.16.1 prior to 424-14 and the title was changed to "Cruising Tables Primary Records."

4.1.17 FIR/UIR Records (UF)

Was numbered 4.17 prior to 424-14.

4.1.17.1 FIR/UIR Primary Records

Was numbered 4.17.1 prior to 424-14 and the title was changed to "FIR/UIR Primary Records."

4.1.18 Restrictive Airspace Records (UR)

Was numbered 4.18 prior to 424-14.

4.1.18.1 Restrictive Airspace Primary Records

Was numbered 4.18.1 prior to 424-14 and the title was changed to "Restrictive Airspace Primary Records."

4.1.18.2 Restrictive Airspace Continuation Records

Was numbered 4.18.2 prior to 424-14 and the title was changed to "Restrictive Airspace Continuation Records."

4.1.18.3 Restrictive Airspace Flight Planning Continuation Records

Was numbered 4.18.3 prior to 424-14 and the title was changed to "Restrictive Airspace Flight Planning Continuation Records."

4.1.19 Grid MORA Records (AS)

Was numbered 4.19 prior to 424-14.

4.1.19.1 Grid MORA Primary Records

Was numbered 4.19.1 prior to 424-14 and the title was changed to "Grid MORA Primary Records."

4.1.20 Airport MSA (Minimum Sector Altitude) Records (PS)

Was numbered 4.20 prior to 424-14 and the title was changed to "Airport MSA (Minimum Sector Altitude) Records (PS)."

4.1.20.1 Airport MSA Primary Records

Was numbered 4.20.1 prior to 424-14 and the title was changed to "Airport MSA Primary Records."

4.1.20.2 Airport MSA Continuation Records

Was numbered 4.20.2 prior to 424-14.

4.1.21 Enroute Airways Restriction Records (EU)

Was numbered 4.21 prior to 424-14.

4.1.21.1 Altitude Exclusion Primary Records

Was numbered 4.21.1 prior to 424-14.

4.1.21.2 Altitude Exclusion Continuation Records

Was numbered 4.21.2 prior to 424-14.

4.1.21A.1 Note Restriction Primary Records

Was numbered 4.21A.1 prior to 424-14.

4.1.21A.2 Note Restriction Continuation Records

Was numbered 4.21A.2 prior to 24-14. 4

4.1.21B.1 Seasonal Closure Primary Records

Was numbered 4.21B.1 prior to 424-14.

4.1.21C.1 Cruising Table Replacement Primary Records

Was numbered 4.21C.1 prior to 424-14.

4.1.21C.2 Cruising Table Replacement Continuation Records

Was numbered 4.21C.2 prior to 424-14.

4.1.22 Airport and Heliport MLS (Azimuth, Elevation and Back Azimuth) Records

Was numbered 4.22 prior to 424-14 and the title was changed to "Airport and Heliport MLS (Azimuth, Elevation and Back Azimuth) Records."

4.1.22.1 Airport and Heliport MLS Primary Records

Was numbered 4.22.1 prior to 424-14 and the title was changed to "Airport and Heliport MLS Primary Records."

4.1.22.2 Airport and Heliport MLS Continuation Records

Was numbered 4.22.2 prior to 424-14 and the title was changed to "Airport and Heliport MLS Continuation Records."

4.1.23 Enroute Communications Record (EV)

Was numbered 4.23 prior to 424-14.

4.1.23.1 Enroute Communications Primary Records

Was numbered 4.23.1 prior to 424-14 and the title was changed to "Enroute Communications Primary Records."

4.1.23.2 Enroute Communications Continuation Records

Was numbered 4.23.2 prior to 424-14 and the title was changed to "Enroute Communications Continuation Records."

4.1.23.3 Enroute Communications Continuation Records

Was numbered 4.23.3 prior to 424-14 and the title was changed to "Enroute Communications Continuation Records."

4.1.24 Preferred Route Records (ET)

Was numbered 4.25 prior to 424-14.

4.1.24.1 Preferred Route Primary Records

Was numbered 4.25.1 prior to 424-14.

4.1.24.2 Preferred Route Continuation Records

Was numbered 4.25.2 prior to 424-14 and the title was changed to "Preferred Route Continuation Records."

4.1.24.3 Preferred Route Continuation Records

Was numbered 4.25.3 prior to 424-14 and the title was changed to "Preferred Route Continuation Records."

4.1.25 Controlled Airspace Records (UC)

Was numbered 4.27 prior to 424-14.

The following text was added to this section:

It includes controlled airspace associated with Airports and Heliports.

4.1.25.1 <u>Controlled Airspace Primary Records</u>

Was numbered 4.27.1 prior to 424-14.

4.1.25.2 <u>Controlled Airspace Continuation Records</u>

Was numbered 4.27.2 prior to 424-14 and the title was changed to "Controlled Airspace Continuation Records

4.1.26 <u>Geographical Reference Table Records (TG)</u>

Was numbered 4.28 prior to 424-14.

4.1.26.1 <u>Geographical Reference Table Primary Records</u>

Was numbered 4.28.1 prior to 424-14 and the title was changed to "Geographical Reference Table Primary Records."

4.1.27 <u>Flight Planning Arrival/Departure Data Record (PR)</u>

This section was added.

4.1.27 <u>Flight Planning Arrival / Departure Data</u>

This section was added.

4.1.27.1 <u>Primary Record</u>

This section was added.

4.1.27.2 <u>Continuation Records</u>

This section was added.

4.1.27.3 <u>Continuation Records</u>

This section was added.

4.1.28 <u>Path Point Records (PP)</u>

This section was added.

4.1.29 <u>GLS Record (PT)</u>

This section was added.

4.1.29.1 <u>Primary Records</u>

This section was added.

4.1.30 <u>Alternate Record (RA)</u>

This section was added.

4.1.30.1 <u>Primary Record</u>

This section was added.

4.2 <u>Master Helicopter User file (HA)</u>

This section was added.

4.2.1 <u>Heliport Records</u>

Was numbered 4.24 prior to 424.14

4.2.1.1 <u>Heliport Primary Records</u>

Was numbered 4.24.1 prior to 424-14 and the title was changed to "Heliport Primary Records."

4.2.1.2 <u>Heliport Continuation Records</u>

Was numbered 4.24.2 prior to 424-14 and the title was changed to "Heliport Continuation Records."

4.2.1.3 <u>Heliport Flight Planning Continuation Records</u>

Was numbered 4.24.3 prior to 424-14 and the title was changed to "Heliport Flight Planning Continuation Records."

4.2.1.4 <u>Heliport Flight Planning Continuation Records</u>

Was numbered 4.24.4 prior to 424-14 and the title was changed to "Heliport Flight Planning Continuation Records."

<u>The Following Sections Have Been Added To Support Rotor-Wing Records</u>:

4.2.2 <u>Heliport Terminal Waypoint Record (HC)</u>

4.2.2.1 <u>Primary Records</u>

4.2.2.2 <u>Continuation Records</u>

4.2.2.3 <u>Flight Planning Continuation Records</u>

4.2.2.4 <u>Flight Planning Continuation Records</u>

4.2.3 <u>Heliport SID/STAR / Approach (HD/HE/HF)</u>

4.2.3.1 <u>Heliport SID/STAR/Approach Primary Records</u>

4.2.3.2 <u>Heliport SID/STAR/Approach Continuation Records</u>

4.2.3.3 <u>Heliport SID/STAR/Approach Flight Planning Continuation Records</u>

4.2.3.4 <u>Heliport SID/STAR/Approach Flight Planning Continuation Records</u>

4.2.4 <u>Heliport MSA (HS)</u>

4.2.4.1 <u>Primary Records</u>

4.2.4.2 <u>Continuation Records</u>

4.2.5 <u>Heliport Communications Records (HV)</u>

Was numbered 4.26 prior to 424-14.

4.2.5.1 <u>Heliport Communications Primary Records</u>

Was numbered 4.26.1 prior to 424-14 and the title was change to "Heliport Communications Primary Records."

4.2.5.2 Heliport Communications Continuation Records

Was numbered 4.26.2 prior to 424-14 and the title was changed to "Heliport Communications Continuation Records."

4.2.5.3 Heliport Communications Continuation Records

Was numbered 4.26.3 prior to 424-14 and the title was changed to "Heliport Communications Continuation Records."

5.5 Subsection Code (SUB CODE)

Section was revised to support Heliport and GLS encoding schemes and the Alternate Record.

5.6 Airport/Heliport Identifier (ARPT/HELI IDENT)

The "Used On" text was expanded to identify airport and heliport identifiers.

5.7 Route Type (RT TYPE):

Section was revised to support Heliport and GLS Route types.

5.8 Route Identifier (ROUTE IDENT)

The existing text was modified to support heliport records.

5.9 SID/STAR Route Identifier (SID/STAR IDENT)

The "Used On" text was revised to support Heliport Records.

5.10 Approach Route Identifier (APPROACH IDENT)

This section was revised to support Heliport Approach Records.

5.11 Transition Identifier (TRANS IDENT)

This section was revised to support Heliport records and the text was modified for clarity.

5.12 Sequence Number (SEQ NR)

The "Used On" text was revised to support Heliport Approach Record.

5.13 Fix Identifier (FIX IDENT)

The "Used On" text was revised to support Heliport Approach Record.

5.17 Waypoint Description Code (DESC CODE)

Text and waypoint description was revised to support Heliport records.

Note 16 was revised to support Final End Point.

Note 19 was added by this Supplement.

5.20 Turn Direction (TURN DIR)

The "Used On" text was revised to support Heliport Approach Record.

5.21 Path and Termination (PATH TERM)

The "Used On" text was revised to support Heliport Approach Record.

5.22 Turn Direction Valid (TDV)

The "Used On" text was revised to support Heliport Approach Record.

5.23 Recommended Navaid (RECD NAV)

Descriptive paragraph was revised to support Heliport.

Item "c" was revised to support GLS navaid.

Item "g" was revised for clarity.

Item "h" and "i" were added were added by Supplement 14.

The "Used On" text was revised to support Heliport Approach Record

5.24 Theta (THETA)

The "Used On" text was revised to support Heliport Approach Records.

5.25 Rho (RHO)

The "Used On" text was revised to support Heliport Approach Records.

5.26 Outbound Magnetic Course (OB MAG CRS)

The "Used On" text was revised to support Heliport Approach Records.

5.27 Route Distance From, Holding Distance/Time (RTE DIST FROM, HOLD DIST/TIME)

The "Used On" text was revised to support Heliport Approach Records.

5.28 Inbound Magnetic Course (IB MAG CRS)

Section was revised to include a paragraph describing the use of "HX" group of Path Terminator codes.

5.29 Altitude Description (ALT DESC)

The last sentence of the Definition/Description paragraph was revised to include "at or above to at or below."

Identifiers "H," "J" and "V" were added to the altitude description table and identifier "R" was remove.

Identifiers B, G, and I of the Waypoint Description Crossing was revised for clarity.

5.30 Altitude/Minimum Altitude

This section revised to support Heliport records.

5.36 Latitude (LATITUDE)

The "Used On" text was revised to support Heliport Records.

5.37 Longitude (LONGITUDE)

The "Used On" text was revised to support Heliport Records.

5.38 DME Identifier (DME IDENT)

The existing text was modified for clarity.

5.39 Magnetic Variation (MAG VAR, D MAG VAR)

The "Used On" text was revised to support GLS Records.

5.42 Waypoint Type

"U" and "V" added to Enroute Waypoints.

"P" added to the Terminal Waypoints.

The "Used On" text was revised to support Heliport Records

5.43 Waypoint Name/Description (NAME/DESC)

The "Used On" text was revised to support Heliport Records.

5.44 Localizer/MLS/GLS Identifier (LOC, MLS, GLS IDENT)

Section revised to support GLS.

5.45 Localizer Frequency (FREQ)

The "Used On" text was revised to included Airport and Heliport.

5.46 Runway Identifier (RUNWAY ID)

The "Used On" text was revised to support Heliport Records.

5.47 Localizer Bearing (LOC BRG)

Character type was changed to Alpha/Numeric.

5.52 Glide Slope Angle (GS ANGLE) Minimum Elevation Angle (MIN ELEV ANGLE)

Section revised to support GLS.

5.53 Transition Altitude/Level (TRANS ALTITUDE/LEVEL.

Section revised to support Heliport records.

5.54 Longest Runway (LONGEST RWY)

The Source/Content paragraph was modified to further define the longest runway.

5.57 Runway Length (RUNWAY LENGTH)

The Source/Content paragraph was modified further to define runway length.

5.58 Runway Magnetic Bearing (RWY BRG)

Character type was changed to Alpha/Numeric.

5.62 Inbound Holding Course (IB HOLD CRS)

Character type was changed to Alpha/Numeric.

5.67 Threshold Crossing Height (TCH)

The "Used On" text was revised to support Heliport Records.

5.70 Vertical Angle (VERT ANGLE)

The "Used On" text was revised to support Heliport Records.

Figure 5-11 and the note on angle constraints were deleted.

5.72 Speed Limit (SPEED LIMIT)

Section revised to support Heliport records.

5.74 Component Elevation (GS ELEV, EL ELEV, AZ ELEV, BAZ ELEV, GLS ELEV)

Section revised to support GLS elevation.

Character type was changed to Alpha/Numeric.

5.75 From/To-Airport/Fix

Section revised to support Alternate Destination Record.

5.77 VIA Code

The note was revised to refer to Figure 5-14.

5.80 ILS Category (CAT)

Section revised to support GLS.

5.81 ATC Indicator (ATC)

The "Used On" text was revised to support Airport and Heliport Records.

5.101 Communication Type (COMM TYPE)

Terminal (TML) was added to the Source/Content.

Airport Comm only column changed to Airport Heliport Comm only.

5.103 Communication Frequency (COMM FREQ)

Source/Content revised to support UHF frequencies.

5.106 Service Indicator (SERV IND)

The column content table header for Enroute Communication Record was changed to 57, 58, and 59.

5.114 Duplicate Indicator (DUP IND)

Note 1, editorial correction were made.

5.115 Directional Restriction

This section is revised to support Preferred Route Records

5.130 Multiple Code (MULTI CD)

The "Used On" text was revised to support Airport and Heliport Records.

5.131 Time Code (TIME CD)

The descriptive paragraph revised for clarity.

Primary and Continuation Records were added when used on Enroute and Airways.

5.134 Cruise Table Identifier (CRSE TBL IDENT)

The "Used On" text was revised reflect Flight Planning and Arrival/Departure Data records.

5.138 Time Indicator (TIME IND)

Greenwich Mean Time was changed to Universal Coordinated Time.

5.144 Center Fix (CENTER FIX)

This section revised to support Heliport records.

5.145 Radius Limit

The "Used On" text was revised to support Airport and Heliport Records.

5.146 Sector Bearing (SEC BRG)

The "Used On" text was revised to support Airport and Heliport Records.

5.147 Sector Altitude (SEC ALT)

The "Used On" text was revised to support Airport and Heliport Records.

5.161 Restriction Altitude (RSTR ALT)

The title of this section was changed.

5.165 Magnetic/True Indicator (M/T IND)

The "Used On" text was revised to support Heliport Records.

5.170 Decision Height (DH)

The "Used On" text was revised to support Airport and Heliport Records.

5.171 Minimum Descent Height (MDH)

The "Used On" text was revised to support Airport and Heliport Records.

5.180 PAD Identifier (PAD IDENT)

Section revised to support Heliport Records.

5.191 Triad Station (TRIAD STA)

Deleted by Supplement 14.

5.192 Group Repetition Interval (GRI)

Deleted by Supplement 14.

5.193 Additional Secondary Phase Factor (ASF)

Deleted by Supplement 14.

5.196 Name Format Indicator (NAME IND)

D, I, and N were added to the table.

Notes 1 and 2 were added.

The "Used On" text was revised to support Airport and Heliport Records.

5.197 Datum Code (DATUM)

The "Used On" text was revised to support Terminal NDB and GLS Transmitted Records.

5.211 Required Navigation Performance (RNP)

Text was rewritten to include ICAO Annex 15 and/or State published rules.

The Following Sections Have Been Added By Supplement 14:

5.222 GPS/FMS Indicator (GPS/FMS IND)

5.223 Operations Type (OPS TYPE)

5.224 Approach Indicator (APP IND)

5.225 Ellipsoidal Height

5.226 Glide Path Angle (GPA)

5.227 Orthometric Height (ORTH HGT)

5.228 Unit of Height (UNIT)

5.229 Path Point Data CRC (CRC)

5.230 Procedure Type (PROC TYPE)

5.231 Along Track Distance (ATD)

5.232 Number of Engines Restriction (NOE)

5.233 Turboprop/Jet Indicator (TURBO)

5.234 RNAV Flag (RNAV)

5.235 ATC Weight Category (ATC WC)

5.236 ATC Identifier (ATC ID)

5.237 Procedure Description (PROC DESC)

5.238 Leg Type Code (LTC)

5.239 Reporting Code (RPT)

5.240 Altitude (ALT)

5.241 Fix Related Transition Code (FRT Code)

5.242 Procedure Category (PROC CAT)

5.243 GLS Station Identifier

5.244 GLS Channel

5.245 Service Volume Radius

5.246 TDMA Slot

5.247 Station Type

5.248 Station Elevation WGS84

5.249 Longest Runway Surface Code (LRSC)

5.250 Alternate Record Type (ART)

5.251 Distance To Alternate (DTA)

5.252 Alternate Type (ALT TYPE)

5.253 Primary and Additional Alternate Identifier (ALT IDENT)

6.10 CRC Calculations

6.10.1 Precision Approach Path Point Cyclic Redundancy Check (CRC) Overview

6.10.2 Generator Polynomials:

6.10.3 32 Bit CRC Calculation

6.11 Application of CRC for Integrity Protection of Straight & Advanced Landing Approach Operations

6.11.2 RNAV GPS/GLS Approach Procedure Path Point Data Field Bits

6.11.3 CRC - Generator Polynomial, G(x)

7.2.2.1 Navaid Waypoint

7.2.2.2 Airport Waypoint

7.2.2.3 Named RNAV Waypoint, Intersections, and Reporting Points

Phonetic Letter Subsection, "County" was changed to "Country."

7.2.5 Reporting Positions Defined by Coordinates

The section was modified to provide a comprehensive definition of reporting positions by coordinates.

7.2.6 Terminal Waypoint

Subsection "A" and "B" was expanded to provide a comprehensive definition of waypoint identifiers.

Subsection "E" and "F" were added.

7.3.4 Navaid Waypoint

This section was added.

7.3.5 Airport Waypoint

This section was added.

ATTACHMENT 5 PATH AND TERMINATOR

Descriptive introductory paragraph revised to clarify the meaning for "must" and "will" and to support rotor-wing procedures.

1.2 Beginning and Ending Leg Types

A Note was added to support rotor-wing procedures.

1.3 Leg Sequencing

Note "&" was expanded to include FC/DF sequences.

1.4 Leg Type Descriptions

Illustrated Leg Types were revised.

1.5 Leg Data fields

Legend "B" was added to leg Data Fields.

2.0 CODING RULES APPLICABLE TO ALL PROCEDURE TYPES

This section was revised to clarify the meaning for "must" and "will" as defined in the introduction of Attachment 5.

Rule 2.3 was expanded to code Termination Altitude to include column 95.

3.0 PATH AND TERMINATION RELATED RULES VALID FOR ALL PROCEDURES TYPES

This section was revised to clarify the meaning for "must" and "will" as defined in the introduction of Attachment 5.

Rule 3.1 the following sentence was added:

For distance terminations, the overfly parameters must be set, otherwise the combination is not permitted.

4.0 STANDARD INSTRUMENT DEPARTURE (SID)CODING RULES

This section was revised to clarify the meaning for "must" and "will" as defined in the introduction of Attachment 5.

Text revised to support rotor-wing procedures.

5.0 STANDARD TERMINAL ARRIVAL ROUTE (STAR) CODING RULES.

This section was revised to clarify the meaning for "must" and "will" as defined in the introduction of Attachment 5.

6.0 APPROACH PROCEDURE RULES VALID FOR ALL PROCEDURE TYPES

This section was revised to clarify the meaning for "must" and "will" as defined in the introduction of Attachment 5.

This section was modified to replace "runway" with "runway or helipad" and replace the term "threshold" with "threshold or alighting point."

Rule 6.9, Loran Procedure Coding and Subsection were deleted by Supplement 14.

This section was revised to add rules for GLS Approach Procedure Coding.

The entire section was modified to support Step-down fixes for approach procedures.

7.0 PRECISION APPROACH PROCEDURES CODING

This section was added.

8.0 NON-PRECISION APPROACH PROCEDURE CODING

This section was added.

9.0 MISSED APPROACH PROCEDURE RULES VALID FOR ALL PROCEDURE

Previously Section 7, prior to Supplement 14.

This section was revised to clarify the meaning for "must" and "will" as defined in the introduction of Attachment 5.

This section was modified to replace "runway" with "runway or helipad" and replace the term "threshold" with "threshold or alighting point."

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SUPPLEMENT 15

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: February 11, 2000

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: January 12, 2000

A. PURPOSE OF THIS SUPPLEMENT

This Supplement introduces revisions and additions to the body and Attachments of ARINC Specification 424. These changes include revisions to Final Approach Fix record and additions to the Missed Approach Procedures.

B. ORGANIZATION OF THIS DOCUMENT

The material in Supplement 15 is integrated into ARINC Specification 424 to form an updated version of the standard.

The changes introduced by Supplement 15 have been identified using change bars and are labeled in the margin by a "c-15" indicator.

C. CHANGES TO SPECIFICATION 424 INTRODUCED BY THIS SUPPLEMENT

This section presents a complete tabulation of the changes and additions to the Specification introduced by this Supplement. Each change or addition is defined by the section number and the title that will be employed. In each case a brief description of the change or addition is included.

1.4 Reference Documentation

The reference to applicable ARINC Standards was updated.

5.7 Route Type (RT TYPE)

The Airport Approach (PF) and Heliport Approach (HF) Records were revised to included Missed Approach, field identifier "Z."

Note 3 were revised to support Qualifiers "P" and "S."

5.11 Transition Identifier (TRANS IDENT)

The Transition Identifier Filed Content was revised to included Missed Approach.

Note 4 was added for Missed Approach Transition.

5.29 Altitude Description (ALT DESC)

Identifiers "G" and "H" were revised for clarity.

The following text was added to this section:

The "V" content will only appear in Approach Route Coding and only for those fixes that are stepdown fixes in the vertical path of the procedure.

5.30 Altitude/Minimum Altitude

The second paragraph of the Source/Content was revised to include the altitude field identifiers.

5.70 Vertical Angle (VERT ANGLE)

The Definition/Description paragraph was revised to clarify the Vertical Angle field.

ATTACHMENT 5 PATH AND TERMINATOR

7.0 PRECISION APPROACH PROCEDURES CODING

Rule 7.1.7 was modified to describe that the vertical angle must be coded in both the Final Approach Fix (FAF) and the fix which carries the Missed Approach Point (MAP) coding.

Rule 7.1.8 was added by this Supplement.

9.0 MISSED APPROACH PROCEDURE RULES VALID FOR ALL PROCEDURE

The following text was added to Rule 9.0:

Identification of multiple missed approach procedures, when coded, will be accomplished through the coding of a specific Transition Identifier which closely aligns with published information.

Rule 9.3.1.4 was added by this Supplement.

Rule 9.3.1.5 was previously 9.3.1.4, additionally 9.3.1.5 was modified to clarify the first leg of the missed approach.