ARINC

NAVIGATION SYSTEMS DATA BASE

ARINC SPECIFICATION 424-18

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Specification 424-17	May 5, 2004	August 31, 2004
Specification 424-18	October 5, 2005	November 23, 2005

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

FOREWORD

Aeronautical Radio, Inc., the AEEC, and ARINC Standards

Aeronautical Radio, Inc. (ARINC) was incorporated in 1929 by four fledgling airlines in the United States as a privately-owned company dedicated to serving the communications needs of the air transport industry. Today, the major U.S. airlines remain the Company's principal shareholders. Other shareholders include a number of non-U.S. airlines and other aircraft operators.

ARINC sponsors aviation industry committees and participates in related industry activities that benefit aviation at large by providing technical leadership and guidance and frequency management. These activities directly support airline goals: promote safety, efficiency, regularity, and cost-effectiveness in aircraft operations.

The Airlines Electronic Engineering Committee (AEEC) is an international body of airline technical professionals that leads the development of technical standards for airborne electronic equipment-including avionics and in-flight entertainment equipment-used in commercial, military, and business aviation. The AEEC establishes consensus-based, voluntary form, fit, function, and interface standards that are published by ARINC and are known as ARINC Standards. The use of ARINC Standards results in substantial benefits to airlines by allowing avionics interchangeability and commonality and reducing avionics cost by promoting competition.

There are three classes of ARINC Standards:

a) ARINC Characteristics – Define the form, fit, function, and interfaces of avionics and other airline electronic equipment. ARINC Characteristics indicate to prospective manufacturers of airline electronic equipment the considered and coordinated opinion of the airline technical community concerning the requisites of new equipment including standardized physical and electrical characteristics to foster interchangeability and competition.

b) ARINC Specifications – Are principally used to define either the physical packaging or mounting of avionics equipment, data communication standards, or a high-level computer language.

c) ARINC Reports – Provide guidelines or general information found by the airlines to be good practices, often related to avionics maintenance and support.

The release of an ARINC Standard does not obligate any airline or ARINC to purchase equipment so described, nor does it establish or indicate recognition or the existence of an operational requirement for such equipment, nor does it constitute endorsement of any manufacturer's product designed or built to meet the ARINC Standard.

In order to facilitate the continuous product improvement of this ARINC Standard, two items are included in the back of this volume:

An Errata Report solicits any corrections to the text or diagrams in this ARINC Standard.

An ARINC IA Project Initiation/Modification (APIM) form solicits any recommendations for addition of substantive material to this volume which would be the subject of a new Supplement.

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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 files. The data on these files are intended for merging with airborne navigation computer operational software to produce media 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 data.

The data bases prescribed by this document are also used by computer flight planning systems, flight simulators, and other applications.

The purpose of the ARINC 424 Navigation System Data Base Standard is to be an enabling document. It enables data base suppliers, avionics systems, and other users of the data bases to fly and flight plan procedures as prescribed by procedure designers. The document is not meant to be a prescriptive document for procedure designers.

This document is also not a requirements document for airborne navigation systems.

Procedures that are not compatible with this data base standard in some cases cannot be coded for inclusion in some airborne data bases.

1.1.1 Coverage of Flight Simulator Needs

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

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 navigation data for use with onboard navigation computers may be viewed as a four-step process (Attachment 1). The first step is the assembly of a data bank. The second is the production of data files 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 final storage media containing these merged data for use on individual aircraft.

Data banks 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 files" shown at the step 2 level in Attachment 1.

To facilitate the sorting process necessary to produce individual airline files, 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 file. 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.

Individual airline files are used in step 3 of the airborne navigation system media 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 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 file production, nor are 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 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.

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 files 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 User File. The new content was all related directly to the heliport and flight operations into and out of heliports. It included helicopter 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.

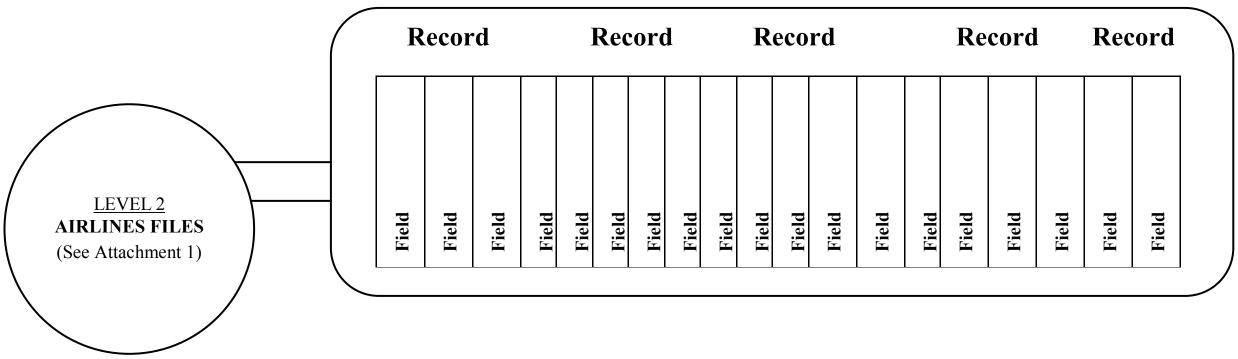
1.4 Reference Documentation

ARINC Characteristic 702: Flight Management Computer System

ARINC Characteristic 702A: Advanced Flight Management Computer System

ARINC Characteristic 756: GNSS Navigation and Landing Unit (GNLU)

1.0 INTRODUCTION



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 (A through Z); any punctuation; or any printable character, other than a numeric, including space.
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.
Sub Section	A collection of records of functional data items. 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 listed alphabetically.

ATC Compulsory Reporting Point	Essential or nonessential 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 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.
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.
Final Approach Course Fix (FACF)	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.
Final Approach Fix (FAF)	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 or more at the FAF, a point shall be computed abeam the OM, on the localizer beam center.
Enroute Airway to Restrictive 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.
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 (IAF)	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.

2.0 GLOSSARY OF TERMS

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.
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 approach facilities that provide an electronic course guidance signal, i.e. “localizer,” including ILS, LOC, BC, IGS, LDA and SDF.
Phantom Waypoint	A database waypoint established during procedure coding to facilitate more accurate navigation by the Flight Management Computer than would be allowed 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 “track to a fix (TF)” legs.
Precision Approach Fix	A point where the glidepath intercepts the intermediate altitude. This point is the beginning of the precision final approach segment.
Precision ARC	A circular arc flight path between two known points, whose construction is tangent to the inbound and outbound paths to/from these points.
Final End Point (FEP)	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.
Mandatory Hold	Any Flight maneuver of a holding nature defined in a terminal procedure where execution is part of the source defined flight path.

2.3 Precision RNAV Terms

Landing Threshold Point/Fictitious Threshold Point (LTP/FTP)	The LTP is a point at the designated center of the landing runway threshold defined by latitude, longitude, and height above the WGS-84 reference ellipsoid. Orthometric height should also be provided for compatibility with non-GNSS systems. The LTP is used in conjunction with the FPAP to determine the lateral alignment of the vertical plane containing the final approach path. A “Fictitious Threshold Point (FTP)” is a name considered for an offset LTP. When used in calculations and databases, it will generally be shown/referred to as an LTP/FTP. Criteria will appear in appropriate documents as the concept evolves.

COMMENTARY

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

Flight Path Control Point (FPCP)	The FPCP is a point above the LTP used to define the vertical component of the precision final approach path. It is in the vertical plane containing the LTP and FPAP. Horizontally the FPCP has the same coordinates as the LTP. Vertically, the elevation of the FPCP is the LTP elevation plus the threshold crossing height.
Flight Path Alignment Point (FPAP)	The FPAP is a point used to define the lateral alignment of the vertical plane containing the final approach path. For approaches that are aligned with the runway, it is located at the designated center of the opposite runway threshold or an extension of a geodesic line calculated between the LTP and the designated center of the opposite runway landing threshold. It is positioned at a distance from the LTP to support a prescribed angular splay of lateral deviations. The FPAP is defined by latitude and longitude. Orthometric height should also be provided for compatibility with non-GNSS systems. The FPAP may be located beyond the opposite end of the landing runway, particularly on short runways.
Glide Path Angle	The glide path angle defines the descent angle of the final approach path. It is defined relative to the horizontal plane, tangent to the WGS-84 ellipsoid at the LTP.

2.0 GLOSSARY OF TERMS

Final Approach Segment (FAS) CRC	(Replacing Precision Approach Path Point Data CRC) - An 8 character hexadecimal representation of the calculated remainder bits used to ensure the integrity of the FAS data block during transmission and storage. Examples: 243BC649, A6934B72. See Chapter Six of this Specification for details on CRC calculations.
(Final Approach Segment) FAS Data Block	The FAS Data Block defines the lateral and vertical paths and associated criteria for the final approach segment of a SBAS (FAS) Data Block or GBAS Approach Procedure. Within an ARINC 424 output file, FAS Data Block data is carried in the Path Point Record and the two terms have been used interchangeably
Level of Service (LPV, LNAV/VNAV, and LNAV	The terms LPV, LNAV/VNAV and LNAV as used in this document starting with Supplement 18 refer to terminology developed by the FAA to denote operating criteria for RNAV procedures. Within this document, these terms as used strictly with regard to operations based on SBAS, although LNAV/VNAV and LNAV operations are often authorized both with and without SBAS for the same procedure. Other government authorities may use other terms to define these criteria. The use of this terminology starting with Supplement 18 of this Specification does not rule out using these terms for that source, as long as the intention of the government source identical to that of the FAA. Should other terms be developed that do not have the identical intent, they will be added to the appropriate portions of this Specification.

3.0 NAVIGATION DATA

3.1 User File Organization

The records defined in Chapter 4 of this document are sorted such that they appear on the master file 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 file 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.

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 file 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 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

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)

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 referenced 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, 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 included can be for either Airports or Heliports.

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

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. The file will also contain those VFR waypoints not associated with Airports or Heliports. 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.

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.

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

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

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

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 (V)

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

3.2.4 Airport Section (P)

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

The Airport Reference Points subsection file should contain reference points for all airports having at least one hard surfaced runway. As a minimum, all airport reference points referenced in Sections 3.2.3.4, 3.2.3.5 and 3.2.5 should be included.

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

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.

3.0 NAVIGATION DATA

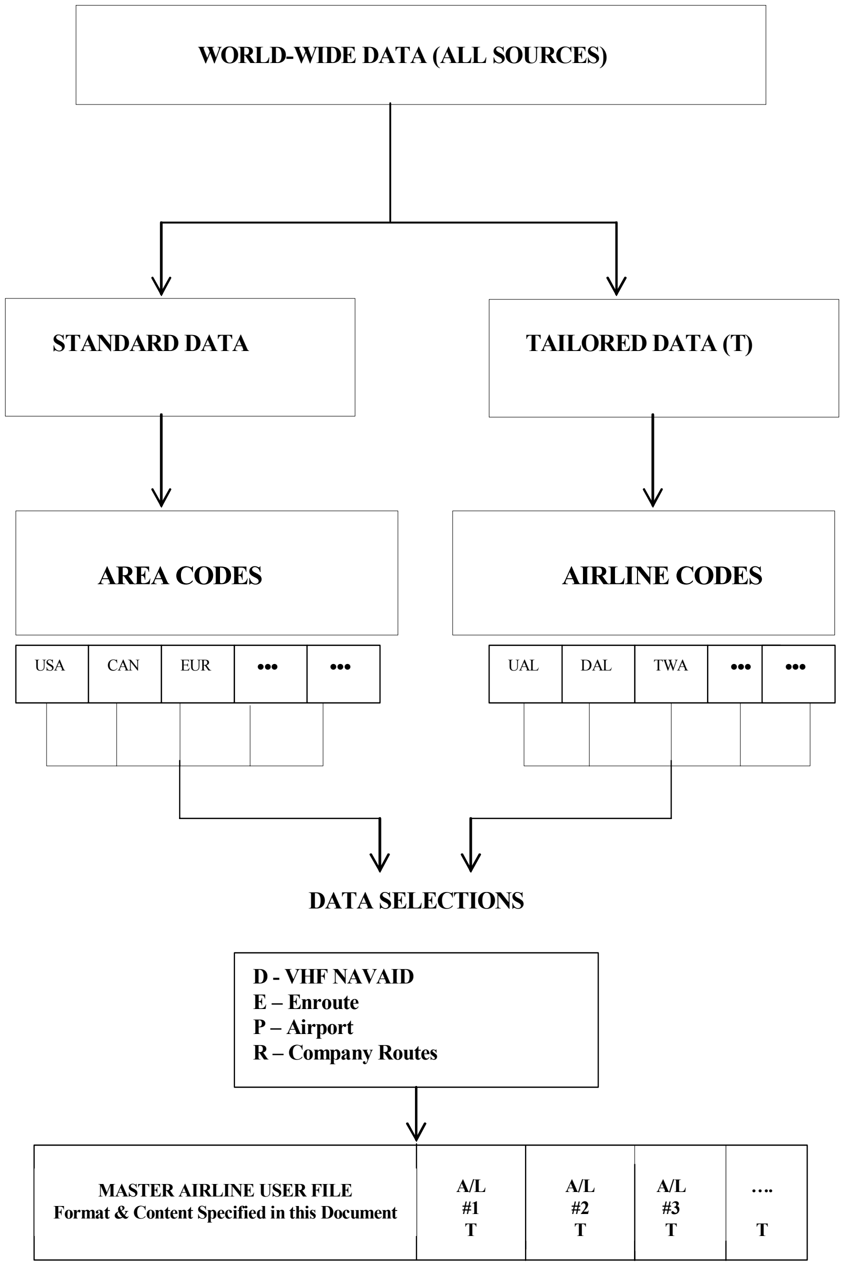


Figure 3-1 – Data Sorting Necessary to Achieve Step 1 of FDSU File Production Process

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

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 as a fix. The file will also contain those VFR waypoints associated with Airports. 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 (D)

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 (E)

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

3.0 NAVIGATION DATA

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.

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.

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

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.

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)

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 (S)

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.

3.2.4.12 Airport Communications Section (P), Subsection (V)

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)

The Terminal NDB Subsection file should contain those Terminal NDB NAVAIDS referenced by records in 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 appear in the Enroute NDB NAVAID (DB) file.

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

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 Sections 3.2.4.7 and 3.3.3. As a minimum, the section should contain all GLS approaches referenced in Sections 3.2.4.6 and 3.3.7.

3.2.4.17 Airport Terminal Arrival Altitude Section (P), Subsection (K)

The Airport TAA (Terminal Arrival Altitude) Subsection should contain the Sector Bearings, Sector Radii, and Sector Altitudes for all government published Approach Procedures referenced in Section 3.2.4.6.

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.

3.0 NAVIGATION DATA

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 (R)

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

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

3.2.7 Cruising 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)

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 (S)

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 [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.

3.3 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.

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)
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. The file will also contain those VFR waypoints associated with Heliports. 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.

3.0 NAVIGATION DATA

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)

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.

3.3.10 Heliport Terminal Arrival Altitude Section (H), Subsection (K)

The Heliport TAA (Terminal Arrival Altitude) Subsection should contain the Sector Bearings, Sector Radii, and Sector Altitudes for all government published Approach Procedures referenced in Section 3.3.7.

4.0 NAVIGATION DATA - RECORD LAYOUT

4.0.1 General

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.

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)

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, 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
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	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
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
65 thru 74	DME Longitude (10)	5.37
75 thru 79	Station Declination (5)	5.66
80 thru 84	DME Elevation (5)	5.40
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
94 thru 123	VOR Name (30)	5.71
124 thru 128	File Record No. (5)	5.31
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	Application Type (1)	5.91
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

4.1.2.3 VHF NAVAID Simulation Continuation Records

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

4.0 NAVIGATION DATA - RECORD LAYOUT

4.1.2.4 VHF NAVAID Flight Planning Continuation Records

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

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

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.

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 (101)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note: Flight Planning continuation records are designed to carry off-cycle updates to the primary record, and cannot carry an Application Type column.

4.1.2.6 VHF NAVAID Limitation Continuation Record

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.

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	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)

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

4.1.3.1 NDB NAVAID 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 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) (23)	
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

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 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

4.1.3.3 NDB NAVAID Simulation Continuation Record

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)	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 UIR within which the NDB NAVAID defined in the Primary Record is located and the Start/End validity dates/times of the Primary Record.

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 911)	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

4.1.3.5 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.

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

Note: Flight Planning continuation records are designed to carry off-cycle updates to the primary record, and cannot carry an Application Type column.

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 and VFR 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.

4.0 NAVIGATION DATA - RECORD LAYOUT

4.1.4.1 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
6	Subsection Code (1)	5.5 Note 1
7 thru 10	Region Code (4)	5.41 Note 2
11 thru 12	ICAO Code (2)	5.14
13	Subsection (1)	5.5 Note 1
14 thru 18	Waypoint Identifier (5)	5.13
19	Blank (Spacing) (1)	
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
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 Mag. 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 No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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.

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
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23	Application Type (1)	5.91
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

4.1.4.3 Waypoint Flight Planning Continuation Records

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

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

4.1.4.4 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
23 thru 123	Fields as on Primary Records (101)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note: Flight Planning continuation records are designed to carry off-cycle updates to the primary record, and cannot carry an Application Type column.

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.

4.0 NAVIGATION DATA - RECORD LAYOUT

4.1.5.1 Holding Pattern 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 65	RNP (3)	5.211
66 thru 71	Arc Radius (6)	5.204
72 thru 98	Reserved (Expansion) (27)	
99 thru 123	Name (25)	5.60
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note1: 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 Records, 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	Application Type (1)	5.91
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

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 101	Fix Radius Transition Indicator (3)	5.254
102 thru 123	Reserved (Expansion) (22)	
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

4.1.6.2 Enroute Airways Continuation Records

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 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

4.1.6.3 Enroute Airways Flight Planning Continuation Records

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.

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

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.

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	
122 thru 128	Field Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note: Flight Planning continuation records are designed to carry off-cycle updates to the primary record, and cannot carry an Application Type column.

4.1.7 Airport Records (PA)

This file contains airport information for all airports within the desired geographical reference area and meeting other criteria on available runways. Additionally, the file contains all airports required to support Enroute Airway structure coding for those areas where Airport reference points are used as enroute airway fixes.

4.1.7.1 Airport 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)	5.14
13	Subsection Code (1)	5.5
14 thru 16	ATA/IATA Designator (3)	5.107
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
31	IFR Capability (1)	5.108
32	Longest Runway Surface Code (1)	5.249
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
62 thru 64	Speed Limit (3)	5.72
65 thru 68	Recommended Navaid (4)	5.23
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
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
129 thru 132	Cycle Date (4)	5.32

4.0 NAVIGATION DATA - RECORD LAYOUT

4.1.7.2 Airport Continuation Records

Column	Field Name (Length)	Reference
1 thru 21	Field as on Primary Records	
22	Continuation Record No. (1)	5.16
23	Application Type (1)	5.91
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

4.1.7.3 Airport Flight Planning Continuation Records

This Continuation Record is used to indicate the FIR and 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.

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.

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

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.

Note: Flight Planning continuation records are designed to carry off-cycle updates to the primary record, and cannot carry an Application Type column.

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	Name (25)	5.60
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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	Application Type (1)	5.91
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

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

Airport SIDs, STARs and Approach Procedures are contained in three separate Section/Subsection groupings, using this single record format. Section/Subsection PD contains a sequential listing of those published Airport Standard Instrument Departures that can be encoded according to this Specification. Section/Subsection PE contains a sequential list of those published Airport Standard Terminal Arrival Routes that can be encoded according to this Specification. Section/Subsection PF contains a sequential listing of those published Airport Standard Instrument Approach Procedures that can be encoded according to this specification.

4.0 NAVIGATION DATA - RECORD LAYOUT

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) Note 1	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 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) Note 4	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 Section (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 or TAA Procedure Turn Indicator (5)	5.144 or 5.271
112	Multiple Code or TAA Sector Identifier (1)	5.130 or 5.272
113 thru 114	ICAO Code (2) Note 3	5.14
115	Section Code (1) Note 3	5.4
116	Subsection Code (1) Note 3	5.5
117	GNSS/FMS Indication (1)	5.222
118	Speed Limit Description (1)	5.261
119	Apch Route Qualifier 1 (1) Note 2	5.7
120	Apch Route Qualifier 2 (1) Note 2	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 Section 5.10.

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

Note 3: When columns 107 thru 116 are providing a reference to a MSA or the center fix for an RF leg, all of the columns are used. When they are providing a reference to a TAA, only columns 107 thru 112 are used and 113 thru 116 are blank.

Note 4: If there is only one set of RNP criteria for the RNAV procedure, that criteria is provided in the RNP value field for Primary Record. Otherwise, the Primary Record contains one consistent set of RNP values for the least restrictive RNAV operating criteria and not a mix of RNP values for different RNP operating criteria.

4.1.9.2 Airport SID/STAR/ Primary Extension Approach Continuation Records

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 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 75	Procedure TCH (3)	5.67
76	Localizer Only Altitude Description (1)	5.29
77 thru 81	Localizer Only Altitude (5)	5.30
82 thru 85	Localizer Only Vertical Angle (4)	5.70
86 thru 89	Blank (Spacing) (4)	
90 thru 92	RNP (3) Note 2	5.211
93 thru 118	Reserved (Expansion) (26)	
119	Apch Route Qualifier 1 (1) Note 1	5.7
120	Apch Route Qualifier 2 (1) Note 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: Columns 119 and 120, (Approach Route Qualifier 1 and 2) are required to match the Primary Record to the Continuation Record(s). This non-standard column sorting sequence was selected to preserve the Primary Record for SID/STAR/Approach Records as much as possible as these new fields were introduced in Supplement 14.

Note 2: For records used to define RNAV Procedures with multiple RNP values and for RNAV Procedures published with multiple RNP operating criteria, the least restrictive values are carried in columns 45 thru 47 of the Primary record for each leg. Columns 90 thru 92 of this Primary Extension Continuation Record will carry the additional government source RNP values. There may be more than one Primary Extension Record provided when the procedure has more than two sets of distinct RNP values.

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	Leg Distance (4)	5.260
79 thru 123	Reserved (Expansion) (45)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.9.4 Airport SID/STAR 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 4.1.9.3.

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

Note: Flight Planning continuation records are designed to carry off-cycle updates to the primary record, and cannot carry an Application Type column.

4.1.9.5 Airport Procedure Data Continuation Record

The Airport Procedure Data Continuation Record is used to provide information on SBAS authorization levels. This Continuation Record is provided once per procedure as a Continuation to Primary Approach Procedure Record that contains the encoding for Final Approach Fix (FAF) of the procedure.

Column	Field Name (Length)	Reference
1 thru 38	Fields as on Primary Record	
39	Continuation Record Number (1)	5.16
40	Application Type (1)	5.91
41	FAS Block Provided	5.276
42 thru 51	FAS Block Provided Level of Service Name (10)	5.275
52	LNAV/VNAV Authorized for SBAS (1)	5.276
53 thru 62	LNAV/VNAV Level of Service Name (10)	5.275
63	LNAV Authorized for SBAS(1)	5.276
64 thru 73	LNAV Level of Service Name (10)	5.275
74 thru 118	Blank (Spacing) (45)	
119	Approach Route Type Qualifier 1 (1) Note 1	5.7
120	Approach Route Type Qualifier 2 (1) Note 1	5.7
121 thru 123	Blank (3)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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

4.1.10 Runway Records (PG)

This file contains runway information.

4.0 NAVIGATION DATA - RECORD LAYOUT

4.1.10.1 Runway 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)	5.14
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 60	Blank (Spacing) (4)	
61 thru 66	(LTP) Ellipsoid Height (6)	5.225
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	TCH Value Indicator (1)	5.270
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

Column	Field Name (Length)	Reference
1 thru 21	Fields as on Primary Records	
22	Continuation Record No. (1)	5.16
23	Application Type (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

4.1.10.3 Runway Simulation Continuation Records

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.

4.0 NAVIGATION DATA - RECORD LAYOUT

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
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
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 106	Supporting Facility ID (4) Note 1	5.33
107 thru 108	Supporting Facility ICAO Code (2) Note 1	5.14
109	Supporting Facility Section Code (1) Note 1	5.4
110	Supporting Facility Subsection Code (1) Note 1	5.5
111 thru 123	Reserved (Expansion) (13)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note 1: Terminal Navaids used as Supporting Facilities must be located at the same airport as the ILS.

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	Application Type (1)	5.91
24 thru 92	Notes (69)	5.61
93 thru 123	Reserved (Expansion) (31)	
124 thru 128	File Record (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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)	
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
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
121 thru 123	Blank (Spacing) (3)	
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 Route Primary Records

Column	Field Name (Length)	Reference
1	Record Type (1)	5.2
2 thru 4	Customer (3)	5.3
5	Section Code (1)	5.4
6	Subsection Code (1)	5.5
7 thru 11	From Airport/Fix (5)	5.75
12	Blank (Spacing) (1)	
13 thru 14	ICAO Code (2)	5.14
15	Section Code (1)	5.4
16	Subsection Code (1)	5.5
17 thru 21	To Airport/Fix (5)	5.75
22	Blank (Spacing) (1)	
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
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
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
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

4.1.13 Airport and Heliport Localizer Marker Records (PM)

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 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) (21)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.13.2 Airport and Heliport Localizer Continuation Records

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 123	Reserved (Expansion) (100)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.14 Airport Communications Records (PV)

4.1.14.1 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	Application Type (1)	5.91
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

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	Application Type (1)	5.91
8	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

4.1.15 Airways Marker Records (EM)

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) (3)	
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

4.1.15.2 Airways Marker Continuation Records

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 123	Reserved (Expansion) (100)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.16 Cruising Tables Records (TC)

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

4.1.16.1 Cruising Table 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	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

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.

4.0 NAVIGATION DATA - RECORD LAYOUT

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

4.1.17.2 FIR/UIR Continuation Records

Column	Field Name (Length)	Reference
1 thru 19	Fields as on Primary Records	
20	Continuation Record No. (1)	5.16
21	Application Type (1)	5.91
22 thru 123	Reserved (Expansion) (102)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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	Filed Name (Length)	Reference
1 thru 24	Fields as on Primary Records	
25	Continuation Record Number (1)	5.16
26	Application Type	5.91
27	Time Code (1)	5.131
28	NOTAM (1)	5.132
29	Time Indicator (1)	5.138
30 thru 39	Time of Operations (10)	5.195
40 thru 49	Time of Operations (10)	5.195
50 thru 59	Time of Operations (10)	5.195
60 thru 69	Time of Operations (10)	5.195
70 thru 79	Time of Operations (10)	5.195
80 thru 89	Time of Operations (10)	5.195
90 thru 99	Time of Operations (10)	5.195
100 thru 123	Controlling Agency (24)	5.140
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.0 NAVIGATION DATA - RECORD LAYOUT

4.1.18.3 Restrictive Airspace 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	Application Type	5.91
27 thru 29	Blank (Spacing) (3)	
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) (10)	
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

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

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 thru 42	Reserved (Spacing) (3)	
43 thru 48	Sector Bearing (6)	5.146
49 thru 51	Sector Altitude (3)	5.147
52 thru 53	Sector Radius (2)	5.145
54 thru 59	Sector Bearing (6)	5.146
60 thru 62	Sector Altitude (3)	5.147
63 thru 64	Sector Radius (2)	5.145
65 thru 70	Sector Bearing (6)	5.146
71 thru 73	Sector Altitude (3)	5.147
74 thru 75	Sector Radius (2)	5.145
76 thru 81	Sector Bearing (6)	5.146
82 thru 84	Sector Altitude (3)	5.147
85 thru 86	Sector Radius (2)	5.145
87 thru 92	Sector Bearing (6)	5.146
93 thru 95	Sector Altitude (3)	5.147
96 thru 97	Sector Radius (2)	5.145
98 thru103	Sector Bearing (6)	5.146
104 thru 106	Sector Altitude (3)	5.147
107 thru 108	Sector Radius (2)	5.145
109 thru 114	Sector Bearing (6)	5.146
115 thru 117	Sector Altitude (3)	5.147
118 thru 119	Sector Radius (2)	5.145
120	Magnetic/True Indicator (1)	5.165
121 thru 123	Reserved (Expansion) (3)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.20.2 Airport MSA Continuation Records

Column	Field Name (Length)	Reference
1 thru 38	Field as on Primary Records	
39	Continuation Record No. (1)	5.16
40	Application Type (1)	5.91
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

4.0 NAVIGATION DATA - RECORD LAYOUT

4.1.21 Enroute Airways Restriction Records (EU)

The Enroute Airway Restriction file will contain altitude and 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 Enroute Airways Restriction Altitude Exclusion 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)	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
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	Block Indicator (1)	5.203
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 a six-character field. This reserved column will permit this usage.

4.1.21A.1 Enroute Airways Restriction 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
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

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.

4.1.21A.2 Enroute Airways Restriction 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	Application Type (1)	5.91
20 thru 51	Reserved (Expansion) (32)	
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

4.0 NAVIGATION DATA - RECORD LAYOUT

4.1.21B.1 Enroute Airways Restriction 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
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
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

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.

4.1.21C.1 Enroute Airways Restriction 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)	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
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

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.

4.1.21C.2 Enroute Airways Restriction 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	Application Type	5.91
20 thru 51	Reserved (Expansion) (32)	
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

4.1.21.2 Enroute Airways Restriction 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	Application Type	5.91
20 thru 51	Reserved (Expansion) (32)	
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
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	Block Indicator (1)	5.203
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (5)	5.32

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

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

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 119	Supporting Facility Identifier (4)	5.33 Note 1
120 thru 121	Supporting Facility ICAO Code (2)	5.14 Note 1
122	Supporting Facility Section Code (1)	5.4 Note 1
123	Supporting Facility Subsection Code (1)	5.5 Note 1
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note 1: Terminal Navaids used as Supporting Facilities must be located at the same airport as the MLS.

4.0 NAVIGATION DATA - RECORD LAYOUT

4.1.22.2 Airport and Heliport MLS Continuation Records

Column	Field Name (Length)	Reference
1 thru 21	Field 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 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

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

Column	Field Name (Length)	Reference
1 thru 55	Fields as on Primary Records	
56	Continuation Record No. (1)	5.16
57	Application Type (1)	5.91
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 93	Reserved (Expansion) (23)	
94 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	Application Type (1)	5.91
58 thru 60	Blank (Spacing) (3)	
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.

4.0 NAVIGATION DATA - RECORD LAYOUT

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) (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	Application Type (1)	5.91
41	Time Code (1)	5.131
42	Time Indicator (1)	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

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	Application Type (1)	5.91
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

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

4.1.25 Controlled Airspace Records (UC)

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.

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 (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	RNP (3)	5.211
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	Controlled Airspace Name (30)	5.216
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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	Application Type	5.91
27	Time Code (1)	5.131
28	NOTAM (1)	5.132
29	Time Indicator (1)	5.138
30 thru 39	Time of Operations (10)	5.195
40 thru 49	Time of Operations (10)	5.195
50 thru 59	Time of Operations (10)	5.195
60 thru 69	Time of Operations (10)	5.195
70 thru 79	Time of Operations (10)	5.195
80 thru 89	Time of Operations (10)	5.195
90 thru 99	Time of Operations (10)	5.195
100 thru 123	Controlling Agency (24)	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 Ind (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

4.1.26.2 Geographical Reference Table Continuation Records

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 thru 123	Reserved (Expansion) (83)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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 Section 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.

4.0 NAVIGATION DATA - RECORD LAYOUT

4.1.27.1 Flight Planning 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	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	Speed Limit Description (1)	5.261
121 thru 123	Blank (Spacing) (3)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.27.2 Flight Planning 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 Type (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

4.1.27.3 Flight Planning 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: 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

4.1.28.1 Path Point 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 Identifier (4)	5.6
11 thru 12	ICAO Code (2)	5.14
13	Subsection Code (1)	5.5
14 thru 19	Approach Procedure Ident (6)	5.10
20 thru 24	*Runway or Helipad Identifier (5) Note 3	5.46 or 5.180
25 thru 26	*Operation Type (2)	5.223
27	Continuation Record Number (1)	5.16
28	*Route Indicator (1)	5.224
29 thru 30	*SBAS Service Provider Identifier (2)	5.255
31 thru 32	*Reference Path Data Selector (2)	5.256
33 thru 36	*Reference Path Identifier (4)	5.257
37	*Approach Performance Designator (1)	5.258
38 thru 48	*Landing Threshold Point Latitude (11)	5.267
49 thru 60	*Landing Threshold Point Longitude (12)	5.268
61 thru 66	*(LTP) Ellipsoid Height (6)	5.225
67 thru 70	*Glide Path Angle (4)	5.226
71 thru 81	*Flight Path Alignment Point Latitude (11)	5.267
82 thru 93	*Flight Path Alignment Point Longitude (12)	5.268
94 thru 98	*Course Width at Threshold (5) Note 4	5.228
99 thru 102	*Length Offset (4)	5.259
103 thru 108	*Path Point TCH (6)	5.265
109	*TCH Units Indicator (1)	5.266
110 thru 112	*HAL (3)	5.263
113 thru 115	*VAL (3)	5.264
116 thru 123	SBAS FAS Data CRC Remainder (8)	5.229
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

Note 1: In the Path Point Record description, the field prefixed with * in the Field Name are those columns that have been determined as required for the data wrap for CRC calculations

Note 2: In order to properly convert values and binary pack these fields for the CRC data wrap, refer to RTCA/DO-229C "Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment" for Final Approach Segment (FAS) Data Block and CRC standards.

Note 3: For procedures designed for helicopter options to a pad or point in space, the runway number is set to "00", the runway letter is set to blank and the pad identifier and/or final approach course are carried in the Continuation Record.

Note 4: When the runway number is set to 00, then the Course Width field is ignored and the course width is 38 meters.

4.1.28.2 Path Point Continuation Records

Column	Field Name (Length)	Reference
1 thru 26	Fields as on Primary Record Type	
27	Continuation Record Number (1)	5.16
28	Application Type (1)	5.91
29 thru 34	(FPAP) Ellipsoid Height (6)	5.225
35 thru 40	(FPAP) Orthometric Height (6)	5.227
41 thru 46	(LTP) Orthometric Height (6)	5.227
47 thru 56	Approach Type Identifier (10)	5.262
57 thru 61	GNSS Channel Number (5)	5.244
62 thru 71	Blank (Spacing) (10)	
72 thru 74	Helicopter Procedure Course (3)	5.269
75 thru 123	Blank (Spacing) (49)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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 GLS 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 (2)	
111 thru 115	Station Elevation WGS 84 (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

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.

4.1.29.2 GLS Continuation Records

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 123	Reserved (Expansion) (100)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

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.

4.1.30.1 Alternate 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	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

4.1.31 Airport TAA (PK)

The Airport Terminal Arrival Altitude (TAA) file contains details relating to TAA sectorization and sector altitudes.

4.1.31.1 Airport TAA 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	TAA Sector Identifier (1)	5.272
21 thru 24	TAA Procedure Turn (4)	5.271
25 thru 29	Blank (Reserved) (5)	
30 thru 34	TAA IAF Waypoint (5)	5.273
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	Reserved (1)	
41	Mag/True Indicator	5.165
42 thru 45	Sector Radius 1 (4)	5.274
46 thru 51	Sector Bearing (6)	5.146
52 thru 54	Sector Minimum Altitude (3)	5.147
55 thru 58	Sector Radius 1 (4)	5.274
59 thru 64	Sector Bearing (6)	5.146
65 thru 67	Sector Minimum Altitude (3)	5.147
68 thru 71	Sector Radius 1 (4)	5.274
72 thru 77	Sector Bearing (6)	5.146
78 thru 80	Sector Minimum Altitude (3)	5.147
81 thru 84	Sector Radius 1 (4)	5.274
85 thru 90	Sector Bearing (6)	5.146
91 thru 93	Sector Minimum Altitude (3)	5.147
94 thru 97	Sector Radius 1 (4)	5.274
98 thru 103	Sector Bearing (6)	5.146
104 thru 106	Sector Minimum Altitude (3)	5.147
107 thru 110	Sector Radius 1 (4)	5.274
111 thru 116	Sector Bearing (6)	5.146
117 thru 119	Sector Minimum Altitude (3)	5.147
120 thru 123	Blank (Spacing) (4)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.1.31.2 Airport Terminal Arrival Altitude Continuation Records

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 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

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.

4.0 NAVIGATION DATA - RECORD LAYOUT

4.2.1 Heliport Records

This file will contain heliport information.

4.2.1.1 Heliport 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 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	Application Type (1)	5.91
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

4.2.1.3 Heliport Flight Planning Continuation Records

This Continuation Record is used to indicate the FIR and 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.

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

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 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

4.2.2 Heliport Terminal Waypoint Records (HC)

The Heliport Terminal Waypoint file contains all terminal waypoints and VFR waypoint 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.

4.0 NAVIGATION DATA - RECORD LAYOUT

4.2.2.1 Heliport Terminal 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
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 Heliport Terminal Waypoint Continuation Records

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 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

4.2.2.3 Heliport Terminal Waypoint Flight Planning Continuation Records

This Continuation Record is used to indicate the FIR and 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) (80)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.2.2.4 Heliport Terminal Waypoint 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

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

Heliport SIDs, STARs and Approach Procedures are contained in three separate section/subsection groupings, using this single record format. Section/Subsection HD contains a sequential listing of those published Heliport Standard Instrument Departures that can be encoded according to this specification. Section/Subsection HE contains a sequential list of those published Heliport Standard Terminal Arrival Routes that can be encoded according to this specification. Section/Subsection HF contains a sequential listing of those published Heliport Standard Instrument Approach Procedures that can be encoded according to this specification.

4.0 NAVIGATION DATA - RECORD LAYOUT

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)	Note 1	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 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)	Note 4	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 or TAA Procedure Turn Indicator (5)		5.144 or 5.271
112	Multiple Code or TAA, Sector Identifier (1)		5.130 or 5.272
113 thru 114	ICAO Code (2)	Note 3	5.14
115	Section Code (1)	Note 3	5.4
116	Subsection Code (1)	Note 3	5.5
117	GNSS/FMS Indicator (1)		5.222
118	Speed Limit Description (1)		5.261
119	Apch Route Qualifier 1 (1)	Note 2	5.7
120	Apch Route Qualifier 2 (1)	Note 2	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 Indicators" see Section 5.10.

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

Note 3: When columns 107 thru 116 are providing a reference to a MSA or the center fix for an RF leg, all of the columns are used. When they are providing a reference to a TAA, only columns 107 thru 112 are used and 113 thru 116 are blank.

Note 4: If there is only one set of RNP criteria for the RNAV procedure, that criteria is provided in the RNP value field for Primary Record. Otherwise, the Primary Record contains one consistent set of RNP values for the least restrictive RNAV operating criteria and not a mix of RNP values for different RNP operating criteria.

4.2.3.2 Heliport SID/STAR/Approach Primary Extension Continuation Records

Column	Field Name (Length)		Reference
1 thru 38	Field as on Primary Records		
39	Continuation Record Number (1)		5.16
40	Application Type (1)		5.91
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 75	Procedure TCH (3)		5.67
76	Localizer Altitude Description (1)		5.29
77 thru 81	Localizer Altitude (5)		5.30
82 thru 85	Localizer VNAV (4)		5.70
86 thru 89	Blank Spacing (4)		
90 thru 92	RNP (3)	Note 2	5.211
93 thru 118	Reserved (Expansion) (26)		
119	Apch Route Qualifier 1 (1)	Note 1	5.7
120	Apch Route Qualifier 2 (1)	Note 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: Columns 119 and 120 (Approach Route Qualifier 1 and 2) are required to match the Primary Record to the Continuation Record(s). This non-standard column 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 2: For records used to define RNAV Procedures with multiple RNP values and for RNAV Procedures published with multiple RNP operating criteria, the least restrictive values are carried in columns 45 thru 47 of the Primary record for each leg. Columns 90 thru 92 of this Primary Extension Continuation Record will carry the additional government source RNP values. There may be more than one Primary Extension Record provided when the procedure has more than two sets of distinct RNP values.

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

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

Note: Flight Planning continuation records are designed to carry off-cycle updates to the primary record, and cannot carry an Application Type column.

4.2.3.5 Heliport Procedure Data Continuation Record

The Heliport Procedure Data Continuation Record is used to provide information on SBAS authorization levels. This Continuation Record is provided once per procedure as a Continuation to Primary Approach Procedure Record that contains the encoding for Final Approach Fix (FAF) of the procedure.

Column	Field Name (Length)	Reference
1 thru 38	Fields as on Primary Record	
39	Continuation Record Number (1)	5.16
40	Application Type (1)	5.91
41	FAS Block Provided (1)	5.276
42 thru 51	FAS Block Provided Level of Service Name (10)	5.275
52	LNAV/VNAV Authorized for SBAS (1)	5.276
53 thru 62	LNAV/VNAV Level of Service Name (10)	5.275
63	LNAV Authorized for SBAS (1)	5.276
64 thru 73	LNAV Level of Service Name (10)	5.275
74 thru 118	Blank (45)	
119	Approach Route Type Qualifier 1 (1) Note 1	5.7
120	Approach Route Type Qualifier 2 (1) Note 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: Columns 119 and 120 (Approach Route Type Qualifiers 1 and 2) are required to match the Primary Record to the Continuation Record(s). This non-standard column sorting sequence was selected to preserve the Primary Record for SID/STAR/Approach Records as much as possible as these new fields were introduced in Supplement 14.

4.2.4 Heliport MSA (HS)

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

4.0 NAVIGATION DATA - RECORD LAYOUT

4.2.4.1 Heliport 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	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 thru 42	Reserved (Spacing) (3)	
43 thru 48	Sector Bearing (6)	5.146
49 thru 51	Sector Altitude (3)	5.147
52 thru 53	Sector Radius (2)	5.145
54 thru 59	Sector Bearing (6)	5.146
60 thru 62	Sector Altitude (3)	5.147
63 thru 64	Sector Radius (2)	5.145
65 thru 70	Sector Bearing (6)	5.146
71 thru 73	Sector Altitude (3)	5.147
74 thru 75	Sector Radius (2)	5.145
76 thru 81	Sector Bearing (6)	5.146
82 thru 84	Sector Altitude (3)	5.147
85 thru 86	Sector Radius (2)	5.145
87 thru 92	Sector Bearing (6)	5.146
93 thru 95	Sector Altitude (3)	5.147
96 thru 97	Sector Radius (2)	5.145
98 thru103	Sector Bearing (6)	5.146
104 thru 106	Sector Altitude (3)	5.147
107 thru 108	Sector Radius (2)	5.145
109 thru 114	Sector Bearing (6)	5.146
115 thru 117	Sector Altitude (3)	5.147
118 thru119	Sector Radius (2)	5.145
120	Magnetic/True Indicator (1)	5.165
121 thru 123	Reserved (Expansion) (3)	
124 thru 128	File Record Number (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.2.4.2 Heliport MSA Continuation Records

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 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

4.2.5 Heliport Communications Records (HV)

These files will contain Heliport Communications Facilities.

4.2.5.1 Heliport 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	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 (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 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	Application Type (1)	5.91
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

4.2.5.3 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	Application Type (1)	5.91
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

4.2.6 Heliport (TAA)

The Heliport Terminal Arrival Altitude (TAA) file contains details relating to TAA sectorization and sector altitudes.

4.2.6.1 Heliport TAA 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	Approach Identifier (6)	5.10
20	Section Code (1)	5.4
20	TAA Sector Identifier (1)	5.272
21 thru 24	TAA Procedure Turn (4)	5.271
25 thru 29	Blank (Reserved) (5)	
30 thru 34	TAA IAF Waypoint (5)	5.273
35 thru 36	ICAO Code (2)	5.14
37	Section Code (1)	5.4
38	Subsection Code (1)	5.5
39	Continuation Record Numbers (1)	5.16
40	Reserved (1)	
41	Mag/True Indicator	5.165
42 thru 45	Sector Radius 1 (4)	5.274
46 thru 51	Sector Bearing (6)	5.146
52 thru 54	Sector Minimum Altitude (3)	5.147
55 thru 58	Sector Radius 1 (4)	5.274
59 thru 64	Sector Bearing (6)	5.146
65 thru 67	Sector Minimum Altitude (3)	5.147
68 thru 71	Sector Radius 1 (4)	5.274
72 thru 77	Sector Bearing (6)	5.146
78 thru 80	Sector Minimum Altitude (3)	5.147
81 thru 84	Sector Radius 1 (4)	5.274
85 thru 90	Sector Bearing (6)	5.146
91 thru 93	Sector Minimum Altitude (3)	5.147
94 thru 97	Sector Radius 1 (4)	5.274
98 thru 103	Sector Bearing (6)	5.146
104 thru 106	Sector Minimum Altitude (3)	5.147
107 thru 110	Sector Radius 1 (4)	5.274
111 thru 116	Sector Bearing (6)	5.146
117 thru 119	Sector Minimum Altitude (3)	5.147
120 thru 123	Blank (Spacing) (4)	
124 thru 128	File Record No. (5)	5.31
129 thru 132	Cycle Date (4)	5.32

4.2.6.2 Heliport Terminal Arrival Altitude Continuation Records

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 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

4.0 NAVIGATION DATA - RECORD LAYOUT

ARINC 424 - 18 RECORD FORMAT

VHF NAVAID (D) 4.1.2.1 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	5.38	5.36	5.37	5.66	5.40	5.149	5.90	5.150	5.197	5.71	5.31	5.32
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 PRO	DATUM CODE	VHF NAVAID NAME (30)	FILE RECORD NUMBER	CYCLE

NOTES:

VHF NAVAID (D) 4.1.2.2 CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16	5.91	5.61		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	NOTES ON CONTINUATION RECORD (69)	RESERVED (31)	FILE RECORD NUMBER	CYCLE

NOTES:

VHF NAVAID (D) 4.1.2.3 SIMULATION CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16	5.91		5.93		5.39	5.92		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE		FAC CHAR		D MAG VAR	FAC ELEV	RESERVED (39)	FILE RECORD NUMBER	CYCLE

NOTES:

VHF NAVAID (D) 4.1.2.4 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	APPL TYPE	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

SAME PARAGRAPH AS ABOVE	5.16	SAME PARAGRAPH AS PRIMARY RECORD (4.1.2.1)	5.31	5.32
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

SAME PARAGRAPH AS ABOVE	5.16	5.91	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
CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	NLC	CAI	SEQ NR	SECTOR	DIST DESC	DIST LIMIT	ALT DESC	ALT LIMIT	SECTOR	DIST DESC	DIST LIMIT	ALT DESC	ALT LIMIT	SECTOR-	DIST DESC	DIST LIMIT	ALT DESC	ALT LIMIT	SECTOR	DIST DESC	DIST LIMIT	ALT DESC	ALT LIMIT	SECTOR	DIST DESC	DIST LIMIT	ALT DESC	ALT LIMIT	SEQ IND	FILE RECORD NUMBER	CYCLE

NOTES:

ARINC 424 - 18 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	5.91	5.61		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	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	APPL TYPE		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	APPL TYPE	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:

ARINC 424 - 18 RECORD FORMAT

WAYPOINT (EA)(PC) 4.1.4.1 PRIMARY

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

NOTES:

WAYPOINT (EA)(PC) 4.1.4.2 CONTINUATION

CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	NOTES ON CONTINUATION RECORD (69)	RESERVED (31)	FILE RECORD NUMBER	CYCLE
SAME PARAGRAPH AS ABOVE	5.16	5.91	5.61		5.31	5.32

NOTES:

WAYPOINT (EA)(PC) 4.1.4.3 FLIGHT PLANNING CONTINUATION

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

NOTES:

WAYPOINT (EA)(PC) 4.1.4.4 FLIGHT PLANNING CONTINUATION

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

NOTES:

HOLDING PATTERN (EP) 4.1.5.1 PRIMARY

S/T	CUST/ AREA	SEC CODE	SUB CODE	REGN CODE	ICAO CODE		DUP IDENT	FIX IDENT	ICAO CODE	SEC CODE	SUB CODE	CONT NR	IB HOLD CRS	TURN DIR	LEG LENGTH	LEG TIME	MINIMUM ALTITUDE	MAXIMUM ALTITUDE	HOLD SPEED	RNP	ARC RADIUS	RESERVED (27)	NAME (25)	FILE RECORD NUMBER	CYCLE
5.2	5.3	5.4	5.5	5.41	5.14		5.114	5.13	5.14	5.4	5.5	5.16	5.62	5.63	5.64	5.65	5.30	5.127	5.175	5.211	5.204		5.60	5.31	5.32

NOTES:

HOLDING PATTERN (EP) 4.1.5.2 CONTINUATION

CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	NOTES ON CONTINUATION RECORD (69)	RESERVED (14)	FILE RECORD NUMBER	CYCLE
SAME PARAGRAPH AS ABOVE	5.16	5.91	5.61		5.31	5.32

NOTES:

ARINC 424-18 RECORD FORMAT

ENROUTE AIRWAYS (ER) 4.1.6.1 PRIMARY

Reference	Field
5.2	S/T
5.3	CUST/ AREA
5.4	SEC CODE
5.5	SUB CODE
5.8	ROUTE IDENT
	SIX CHAR
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
5.18	BDY CODE
5.7	RT TYPE
5.19	LEVEL
5.115	DIRECT
5.134	TC IND
5.164	EU IND
5.23	RECD VHF
5.14	ICAO CODE
5.211	RNP
5.24	THETA
5.25	RHO
5.26	OB MAG CRS
5.27	ROUTE FROM DIST
5.28	IB MAG CRS
5.30	MIN ALTITUDE
5.30	MIN ALTITUDE
5.127	MAX ALTITUDE
5.254	FIX RADIUS
	RESERVED (22)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

ENROUTE AIRWAYS (ER) 4.1.6.2 CONTINUATION

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

NOTES:

ENROUTE AIRWAYS (ER) 4.1.6.3 FLIGHT PLANNING CONTINUATION

Reference	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.91	APPL TYPE
5.152	S/E IND
5.153	START/END DATE
5.14	ICAO CODE
5.128	REST TYPE
5.129	RESTRICTIVE AIRSPACE DESIGNATION
5.130	MULTI CD
5.14	ICAO CODE
5.128	REST TYPE
5.129	RESTRICTIVE AIRSPACE DESIGNATION
5.130	MULTI CD
5.14	ICAO CODE
5.128	REST TYPE
5.129	RESTRICTIVE AIRSPACE DESIGNATION
5.130	MULTI CD
5.14	ICAO CODE
5.128	REST TYPE
5.129	RESTRICTIVE AIRSPACE DESIGNATION
5.130	MULTI CD
5.174	LK CONT
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

ENROUTE AIRWAYS (ER) 4.1.6.4 FLIGHT PLANNING CONTINUATION

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

NOTES:

AIRPORT (PA) 4.1.7.1 PRIMARY

Reference	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
5.107	ATA/ IATA
	RESERVED
5.16	CONT NR
5.73	SPEED LIMIT ALTITUDE
5.54	LONGEST RWY
5.108	IFR
5.249	LONG RWY
5.36	LATITUDE
5.37	LONGITUDE
5.39	MAG VAR
5.55	ELEV
5.72	SPEED LIMIT
5.23	RECD VHF
5.14	ICAO CODE
5.53	TRANS ALTITUDE
5.53	TRANS LEVEL
5.177	PUB/MIL
5.178	TIME ZONE
5.179	DAY TIME
5.165	M/T IND
5.197	DATUM CODE
	RESVD (4)
5.71	AIRPORT NAME (30)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

AIRPORT (PA) 4.1.7.2 CONTINUATION

Reference	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.91	APPL TYPE
	NOTES ON CONTINUATION RECORD (69)
	RESERVED (59)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

AIRPORT (PA) 4.1.7.3 FLIGHT PLANNING CONTINUATION

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

NOTES:

AIRPORT (PA) 4.1.7.4 FLIGHT PLANNING CONTINUATION

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

NOTES:

ARINC 424 - 18 RECORD FORMAT

AIRPORT GATE (PB) 4.1.8.1 PRIMARY

Reference	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
5.56	GATE IDENT
5.16	CONT NR
5.36	LATITUDE
5.37	LONGITUDE
5.XXX	MAG HDG RESV FOR SIM
	RESERVED (43)
5.60	NAME (25)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

AIRPORT GATE (PB) 4.1.8.2 CONTINUATION

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

NOTES:

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

Reference	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
5.9 & 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
5.5	SEC CODE
5.5	SUB CODE
5.16	CONT NR
5.17	DESC CODE
5.20	TURN DR
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
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 or 5.271	CENTER FIX OR TAA PT
5.130 or 5.272	MULTI CD
5.14	ICAO CODE
5.4	SEC CODE
5.5	SUB CODE
5.222	GNSS/FMS IND
5.261	SPD LMT
5.7	RTE QUAL1
5.7	RTE QUAL2
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

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

Reference	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.91	APPL TYPE
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
5.67	TCH
5.29	ALT DESC
5.30	LOC ALTITUDE
5.70	VERT ANGLE
5.211	RNP
	RESERVED (26)
5.7	RTE QUAL1
5.7	RTE QUAL2
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

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

Reference	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.91	APPL TYPE
5.152	S/E IND
5.153	START/END DATE
5.260	LEG DISTANCE
	RESERVED (45)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

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

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

NOTES:

AIRPORT PROCEDURE DATA CONTINUATION RECORD 4.1.9.5 FLIGHT PLANNING CONTINUATION

Reference	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.91	APPL TYPE
5.276	FAS BLOCK
5.275	FAS BLOCK PROVIDED LEVEL OF SERVICE NAME
5.276	LNAV/VNAV
5.275	LNAV/VNAV LEVEL OF SERVICE NAME
5.276	LNAV FOR SBAS
5.275	LNAV LEVEL OF SERVICE NAME
5.7	APP RTE TYPE Q1
5.7	APP RTE TYPE Q2
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

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		5.225	5.68	5.69	5.67	5.109	5.270	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		(LTP) ELLIPSOID HEIGHT	LNDG THRES ELEV	DSPLCD THR	TCH	WIDTH	TCH	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 PARAGRAPH AS ABOVE	5.16	5.91	5.61		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	NOTES ON CONTINUATION RECORD (69)	RESERVED (31)	FILE RECORD NUMBER	CYCLE

NOTES:

RUNWAY (PG) 4.1.10.3 SIMULATION CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16	5.91		5.94	5.95		5.98	5.97		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE		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	5.33	5.14	5.4	5.5	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	SUPPORT FACILITY	ICAO CODE	SEC CODE	SUB CODE	RESERVED (13)	FILE RECORD NUMBER	CYCLE

NOTES:

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

SAME PARAGRAPH AS ABOVE	5.16	5.91	5.61		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	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 PARAGRAPH AS 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	APPL TYPE		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:

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 & HELIPORT LOCALIZER (PM) 4.1.13.2 CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16	5.91		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	RESERVED (100)	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 PARAGRAPH AS ABOVE	5.16	5.91	5.186		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	NARRATIVE (60)	RESERVED (36)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT COMM (PV) 4.1.14.3 CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16	5.91	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	APPL TYPE	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	HI LOW		LATITUDE	LONGITUDE	MINOR AXIS TRUE BRG	RESERVED (19)	MAG VAR	FAC ELEV	DATUM CODE		MARKER NAME (30)	FILE RECORD NUMBER	CYCLE

NOTES:

AIRWAYS MARKER 4.1.15.2 (EM) CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16	5.91		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	RESERVED (100)	FILE RECORD NUMBER	CYCLE

NOTES:

CRUISING TABLES (TC) 4.1.16.1

PRIMARY

Ref	Field
5.2	S/T
5.4	SEC CODE
5.5	SUB CODE
5.134	CRSE TBL IDENT
5.12	SEQ number
5.135	COURSE FROM
5.135	COURSE TO
5.165	M/T IND
5.136	CRUISE LEVEL FROM
5.137	VERTICAL SEPARATION
5.136	CRUISE LEVEL TO
5.136	CRUISE LEVEL FROM
5.137	VERTICAL SEPARATION
5.136	CRUISE LEVEL TO
5.136	CRUISE LEVEL FROM
5.137	VERTICAL SEPARATION
5.136	CRUISE LEVEL TO
5.136	CRUISE LEVEL FROM
5.137	VERTICAL SEPARATION
5.136	CRUISE LEVEL TO
	RESERVED (24)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

FIR/UIR (UF) 4.1.17.1

PRIMARY

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

NOTES:

FIR/UIR (UF) 4.1.17.2

CONTINUATION

Ref	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.91	APPL TYPE
	RESERVED (102)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

RESTRICTIVE AIRSPACE (UR) 4.1.18.1

PRIMARY

Ref	Field
5.2	S/T
5.3	CUST/AREA
5.4	SEC CODE
5.5	SUB CODE
5.14	ICAO CODE
5.128	REST TYPE
5.129	RESTRICTIVE AIRSPACE DESIGNATION
5.130	MULTI CD
5.12	SEQ NR
5.16	CONT NR
5.19	LEVEL
5.131	TIME CD
5.132	NOTAM
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 BNG
5.121	LOWER LIMIT
5.133	UNIT IND
5.121	UPPER LIMIT
5.133	UNIT IND
5.126	RESTRICTIVE AIRSPACE NAME (30)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

RESTRICTIVE AIRSPACE (UR) 4.1.18.2

CONTINUATION

Ref	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.91	APPL TYPE
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
5.140	CONTROLLING AGENCY (24)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

RESTRICTIVE AIRSPACE (UR) 4.1.18.3

CONTINUATION

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

NOTES:

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

PRIMARY

Ref	Field
5.2	S/T
5.4	SEC CODE
5.5	SUB CODE
5.141	START LAT
5.142	START LONG
5.143	MORA
5.143	MORA
5.143	MORA
5.143	MORA
5.143	MORA
5.143	MORA
5.143	MORA
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5.143	MORA
5.143	MORA
5.143	MORA
5.143	MORA
5.143	MORA
5.143	MORA
	RESVD
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

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

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

NOTES:

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

Ref	SAME PARAGRAPH AS ABOVE	5.16	5.91	5.61		5.31	5.32
Field	CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	NOTES ON CONTINUATION RECORD (69)	RESERVED (14)	FILE RECORD NUMBER	CYCLE

NOTES:

ENROUTE AIRWAYS RESTRICTION RECORDS (EU) 4.1.21.1 ALTITUDE EXCLUSION PRIMARY

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

NOTES:

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

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

NOTES:

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

Ref	SAME PARAGRAPH AS ABOVE	5.16	5.91		5.163		5.31	5.32
Field	CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	RESERVED (32)	RESTRICTION NOTES (69)		FILE RECORD NUMBER	CYCLE

NOTES:

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

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

NOTES:

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

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

NOTES:

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

Ref	SAME PARAGRAPH AS ABOVE	5.16	5.91		5.131	5.138					5.134		5.31	5.32
Field	CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	RESERVED (32)	TIME CD	TIME IND	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	CRSE TBL IDENT		FILE RECORD NUMBER	CYCLE

NOTES:

ENROUTE AIRWAYS RESTRICTION RECORDS (EU) 4.1.21.2 ALTITUDE EXCLUSION CONTINUATION

Ref	SAME PARAGRAPH AS ABOVE	5.16	5.91		5.131	5.138	5.195	5.195	5.195	5.195	5.202	5.160	5.161	5.203	5.161	5.203	5.161	5.203	5.161	5.203	5.161	5.203	5.161	5.203	5.161	5.203	5.31	5.32
Field	CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	RESERVED (32)	TIME CD	TIME IND	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	TIME OF OPERATION	EXC IND	UNITS ALT	REST ALT	BLCK IND	REST ALT	BLCK IND	REST ALT	BLCK IND	REST ALT	BLCK IND	REST ALT	BLCK IND	REST ALT	BLCK IND	REST ALT	BLCK IND	FILE RECORD NUMBER	CYCLE

NOTES:

AIRPORT & HELIPORT MLS (PL) 4.1.22.1 PRIMARY

Field	Reference
S/T	5.2
CUST/AREA	5.3
SEC CODE	5.4
ARPT IDENT	5.6
ICAO CODE	5.14
SUB CODE	5.5
MLS IDENT	5.44
CAT	5.80
(blank)	
CONT NR	5.16
CHANNEL	5.166
(blank)	
RUNWAY IDENT	5.46
AZ LATITUDE	5.36
AZ LONGITUDE	5.37
MLS AZ BRG	5.167
EL LATITUDE	5.36
EL LONGITUDE	5.37
AZ FR RWY END	5.167
+/-@	5.49
EL FR RWY THR	5.50
AZ PRO RIGHT	5.168
AZ PRO LEFT	5.168
AZ COV RIGHT	5.172
AZ COV LEFT	5.172
EL ANGLE SPAN	5.169
MAG VAR	5.39
EL ELEV	5.74
NOM ELEV ANGLE	5.173
MIN ELEV ANGLE	5.52
FAC IDEN	5.33
ICAO CODE	5.14
SEC CODE	5.4
SUB CODE	5.5
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

AIRPORT & HELIPORT MLS (PL) 4.1.22.2 CONTINUATION

Field	Reference
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPH AS ABOVE
CONT NR	5.16
APPL TYPE	5.91
(blank)	
FAC CHAR	5.93
BAZ LATITUDE	5.36
BAZ LONGITUDE	5.37
MLS BAZ BRG	5.167
MLS DP LATITUDE	5.36
MLS DP LONGITUDE	5.37
BAZ FR RWY END	5.167
+/-@	5.49
(blank)	
BAZ PRO RIGHT	5.168
BAZ PRO LEFT	5.168
BAZ COV RIGHT	5.172
BAZ COV LEFT	5.172
BAZ TRUE BRG	5.94
SOURCE	5.95
AZ TRUE BRG	5.94
SOURCE	5.95
TCH	5.67
RESERVED (14)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

ENROUTE COMM (EV) 4.1.23.1 PRIMARY

Field	Reference
S/T	5.2
CUST/AREA	5.3
SEC CODE	5.4
SUB CODE	5.5
FIR/RDO IDENT	5.190
FIR/UIR ADDRESS	5.151
IND	5.117
(blank)	
REMOTE SITE NAME (25)	5.189
COMM TYPE	5.101
COMM FREQ	5.103
G/T	5.182
FREQ UNIT	5.104
CONT NR	5.16
SERV IND	5.106
RADAR	5.102
MODULAT	5.198
SIG EM	5.199
LATITUDE	5.36
LONGITUDE	5.37
MAG VAR	5.39
FAC ELEV	5.92
H24 IND	5.181
ALT DESC	5.29
ALTITUDE 1	5.184
ALTITUDE 2	5.184
REMOTE FAC	5.200
ICAO CODE	5.14
SEC CODE	5.4
SUB CODE	5.5
RESERVED (12)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

ENROUTE COMM (EV) 4.1.23.2 CONTINUATION

Field	Reference
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPH AS ABOVE; 5.61
CONT NR	5.16
APPL TYPE	5.91
TIME CD	5.131
NOTAM	5.132
TIME IND	5.138
TIME OF OPERATION	5.195
RESERVED (23)	
CALL SIGN (30)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

ENROUTE COMM (EV) 4.1.23.3 CONTINUATION

Field	Reference
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPH AS ABOVE; 5.61
CONT NR	5.16
APPL TYPE	5.91
(blank)	
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
RESERVED (3)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

PREFERRED ROUTES (ET) 4.1.24.1 PRIMARY

Field	Reference
S/T	5.2
CUST/AREA	5.3
SEC CODE	5.4
SUB CODE	5.5
(blank)	
ROUTE IDENT	5.8
USE IND	5.220
SEQ NR	5.12
(blank)	
CONT NR	5.16
TO FIX IDENT	5.83
ICAO CODE	5.14
SEC CODE	5.4
SUB CODE	5.5
VIA	5.77
SID/STAR/AWY IDENT	5.78
CUST/AREA	5.3
LEVEL	5.19
RTE TYPE	5.7
INT APT/FIX	5.194
ICAO CODE	5.14
SEC CODE	5.4
SUB CODE	5.5
TERM APT/FIX	5.194
ICAO CODE	5.14
SEC CODE	5.4
SUB CODE	5.5
MIN ALTITUDE	5.30
MAX ALTITUDE	5.127
TIME CD	5.131
ACFT USE GROUP	5.221
DIRECT	5.115
ALT DESC	5.29
ALTITUDE ONE	5.30
ALTITUDE TWO	5.30
RESERVED (18)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

PREFERRED ROUTES (ET) 4.1.24.2 CONTINUATION

Field	Reference
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPH AS ABOVE
CONT NR	5.16
APPL TYPE	5.91
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
TIME OF OPERATION	5.195
TIME OF OPERATION	5.195
TIME OF OPERATION	5.195
RESERVED (11)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

PREFERRED ROUTES (ET) 4.1.24.3 CONTINUATION

Field	Reference
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPH AS ABOVE
CONT NR	5.16
APPL TYPE	5.91
NOTES ON CONTINUATION RECORD (69)	5.61
RESERVED (14)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

ARINC 424 - 18 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
5.130	MULTI CD
5.12	SEQ NR
5.16	CONT NR
5.19	LEVEL
5.131	TIME CD
5.132	NOTAM
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 PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.91	APPL TYPE
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 (24)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

GEOGRAPHICAL REFERENCE TABLE RECORDS (TG) 4.1.26.1 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
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
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
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

GEOGRAPHICAL REFERENCE TABLE RECORDS (TG) 4.1.26.2 CONTINUATION

Ref	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.91	APPL TYPE
	RESERVED (83)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

FLIGHT PLANNING ARRIVAL/DEPARTURE (PR) 4.1.27.1 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
5.9, 5.10	SID/STAR/APRCH 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
5.261	SPD LMT
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

FLIGHT PLANNING ARRIVAL/DEPARTURE (PR) 4.1.27.2 CONTINUATION

Ref	Field
SAME PARAGRAPH AS 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 PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.91	APPL TYPE
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 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
5.10	APPROACH IDENT
5.46 or 5.180	RUNWAY OR HELIPAD IDENT
5.223	OPS TYPE
5.16	CONT NR
5.224	RTE IND
5.255	SBAS SPI
5.256	REF PATH DATA SEL
5.257	REF PATH DATA IDENTIFIER
5.258	APP PD
5.266	LTP LATITUDE
5.267	LTP LONGITUDE
5.225	LTP ELLIPSOID HEIGHT
5.226	GPA
5.267	FPAP LATITUDE
5.268	FPAP LONGITUDE
5.227	COURSE WIDTH AT THRESHOLD
5.259	LENGTH OFFSET
5.265	PATH POINT TCH
5.266	TCH IND
5.263	HAL
5.264	VAL
5.229	CRC
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

PATH POINT (PP) 4.1.28.2 CONTINUATION

Ref	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.91	APPL TYPE
5.225	FPAP ELLIPSOID HEIGHT
5.227	FPAP ORTHOMETRIC HEIGHT
5.227	LTP ORTHOMETRIC HEIGHT
5.262	APPROACH TYPE IDENT
5.244	GNSS CHANNEL NO.
5.269	HPC
	RESERVED (49)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

4.0 NAVIGATION DATA - RECORD LAYOUT

ARINC 424 - 18 RECORD FORMAT

GLS (PT) 4.1.29.1 PRIMARY

Ref	Field
5.2	S/T
5.3	CUST/ AREA
5.4	SEC CODE
5.6	ARPT OR IDENT HEPT
5.14	ICAO CODE
5.5	SUB CODE
5.44	GLS REF PATH IDENT
5.80	GLS CAT
5.16	CONT NR
5.244	GLS CHANNEL
5.46	RUNWAY IDENT
5.47	GLS APP BEARING
5.36	STATION LATITUDE
5.37	STATION LONGITUDE
5.243	GLS IDENT
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
5.248	STATION ELEVATION (WGS-84)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

GLS (PT) 4.1.29.2 CONTINUATION

Ref	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.91	APPL TYPE
	RESERVED (100)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

ALTERNATE RECORD (RA) 4.1.30.1 PRIMARY

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

NOTES:

AIRPORT TAA (PK) 4.1.31.1 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
5.10	APPROACH IDENT
5.272	TAA SI
5.271	TAA PROCEDURE TURN
5.273	TAA IAF WAYPOINT
5.14	ICAO CODE
5.4	SEC CODE
5.5	SUB CODE
5.16	CONT NR
5.165	M/T IND
5.274	SECTOR RADIUS
5.146	SECTOR BEARING
5.147	SECTOR MIN ALT
5.274	SECTOR RADIUS
5.146	SECTOR BEARING
5.147	SECTOR MIN ALT
5.274	SECTOR RADIUS
5.146	SECTOR BEARING
5.147	SECTOR MIN ALT
5.274	SECTOR RADIUS
5.146	SECTOR BEARING
5.147	SECTOR MIN ALT
5.274	SECTOR RADIUS
5.146	SECTOR BEARING
5.147	SECTOR MIN ALT
5.274	SECTOR RADIUS
5.146	SECTOR BEARING
5.147	SECTOR MIN ALT
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

AIRPORT TAA (PK) 4.1.31.2 CONTINUATION

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

NOTES:

HELIPORT (HA) 4.2.1.1 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
5.107	ATA/ IATA
5.180	PAD IDENT
5.16	CONT NR
5.73	SPEED LIMIT ALTITUDE
5.197	DATUM CODE
5.108	IFR
5.36	LATITUDE
5.37	LONGITUDE
5.39	MAG VAR
5.55	ELEV
5.72	SPEED LIMIT
5.23	RECD VHF
5.14	ICAO CODE
5.53	TRANS ALTITUDE
5.53	TRANS LEVEL
5.177	PUB/MIL
5.178	TIME ZONE
5.179	DAY TIME
5.176	PAD DIMENSIONS
5.165	M/T IND
	RESERVED
5.71	HELIPORT NAME (30)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

HELIPORT (HA) 4.2.1.2 CONTINUATION

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

NOTES:

HELIPORT (HA) 4.2.1.3 FLIGHT PLANNING CONTINUATION

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

NOTES:

HELIPORT (HA) 4.2.1.4 FLIGHT PLANNING CONTINUATION

Ref	Field
SAME PARAGRAPH AS ABOVE	CONTINUATION RECORD SAME AS ABOVE
5.16	CONT NR
5.91	APPL TYPE
	NOTES ON CONTINUATION RECORD (69)
	RESERVED (31)
5.31	FILE RECORD NUMBER
5.32	CYCLE

NOTES:

4.0 NAVIGATION DATA - RECORD LAYOUT

ARINC 424 - 18 RECORD FORMAT

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.XX X	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	USEAGE	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	5.91	5.61		5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	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	APPL TYPE	FIR IDENT	UIR IDENT	S/E IND	START/END DATE	RESERVED (80)	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:

HELIPORT SIDS/STARS/APPROACH (HD/HE/HF) 4.2.3.1 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	5.4	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	5.271 or 5.144	5.130 or 5.272	5.14	5.4	5.5	5.222	5.261	5.7	5.7	5.31	5.32
S/T	CUST/ AREA	SEC CODE	HELIPORT 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 DR	RNP	PATH TERM	TDV	RECD NAVAID	ICAO CODE	ARC RADIUS	THETA	RHO	MAG CRS	RTE DIST HOLD DIST/TIME	SEC CODE	SUB CODE	RESERVED	ALT DESC	ATC	ALTITUDE	ALTITUDE	TRANS ALTITUDE	SPEED LIMIT	VERT ANGLE	CENTER FIX or TAA PROC TURN IND	MULTI CD	ICAO CODE	SEC CODE	SUB CODE	GNSS/FMS	SPD LMT	RTE QUAL1	RTE QUAL2	FILE RECORD NUMBER	CYCLE

NOTES:

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

SAME PARAGRAPH AS ABOVE	5.16	5.91	5.170	5.170	5.170	5.170	5.171	5.171	5.171	5.171	5.67	5.29	5.30	5.70	5.211		5.7	5.7	5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	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 TCH	ALT DESC	LOC ALT	LOC VNAV	RNP	RESERVED (26)	RTE QUAL1	RTE QUAL2	FILE RECORD NUMBER	CYCLE

NOTES:

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

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

NOTES:

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

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

NOTES:

HELIPORT PROCEDURE DATA CONTINUATION RECORD 4.2.3.5 FLIGHT PLANNING CONTINUATION

SAME PARAGRAPH AS ABOVE	5.16	5.91	5.276	5.275	5.276	5.275	5.276	5.275	5.7	5.7	5.31	5.32
CONTINUATION RECORD SAME AS ABOVE	CONT NR	APPL TYPE	FAS BLOCK	FAS BLOCK PROVIDED LEVEL OF SERVICE NAME	LNAV/VNAV	LNAV/VNAV LEVEL OF SERVICE NAME	LNAV FOR SBAS	LNAV LEVEL OF SERVICE NAME	APP RTE TYPE Q1	APP RTE TYPE Q2	FILE RECORD NUMBER	CYCLE

NOTES:

ARINC 424 - 18 RECORD FORMAT

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

Field	Reference
S/T	5.2
CUST/AREA	5.3
SEC CODE	5.4
(blank)	
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
(blank)	
SEC BRG	5.146
SEC ALT	5.147
SEC RAD	5.145
SEC BRG	5.146
SEC ALT	5.147
SEC RAD	5.145
SEC BRG	5.146
SEC ALT	5.147
SEC RAD	5.145
SEC BRG	5.146
SEC ALT	5.147
SEC RAD	5.145
SEC BRG	5.146
SEC ALT	5.147
SEC RAD	5.145
SEC BRG	5.146
SEC ALT	5.147
SEC RAD	5.145
SEC BRG	5.146
SEC ALT	5.147
SEC RAD	5.145
MAG IND	5.165
RESRVD EXP (3)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

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

Field	Reference
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPH AS ABOVE
CONT NR	5.16
APPL TYPE	5.91
NOTES ON CONTINUATION RECORD (69)	5.61
RESERVED (14)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

HELIPORT COMM (HV) 4.2.5.1 PRIMARY

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

NOTES:

HELIPORT COMM (HV) 4.2.5.2 CONTINUATION

Field	Reference
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPH AS ABOVE
CONT NR	5.16
APPL TYPE	5.91
NARRATIVE (60)	5.186
RESERVED (36)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

HELIPORT COMM (HV) 4.2.5.3 CONTINUATION

Field	Reference
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPH AS ABOVE
CONT NR	5.16
APPL TYPE	5.91
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
RESERVED (23)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

HELIPORT TAA (HK) 4.2.6.1 PRIMARY

Field	Reference
S/T	5.2
CUST/AREA	5.3
SEC CODE	5.4
(blank)	
HELI IDENT	5.6
ICAO CODE	5.14
SUB CODE	5.5
APPROACH IDENT	5.10
TAA SI	5.272
TAA PROCEDURE TURN	5.271
(blank)	
TAA IAF WAYPOINT	5.273
ICAO CODE	5.14
SEC CODE	5.4
SUB CODE	5.5
CONT NR	5.16
(blank)	
M/T IND	5.165
SECTOR RADIUS	5.274
SECTOR BEARING	5.146
SECTOR MIN ALT	5.147
SECTOR RADIUS	5.274
SECTOR BEARING	5.146
SECTOR MIN ALT	5.147
SECTOR RADIUS	5.274
SECTOR BEARING	5.146
SECTOR MIN ALT	5.147
SECTOR RADIUS	5.274
SECTOR BEARING	5.146
SECTOR MIN ALT	5.147
SECTOR RADIUS	5.274
SECTOR BEARING	5.146
SECTOR MIN ALT	5.147
(blank)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

HELIPORT TAA (HK) 4.2.6.2 CONTINUATION

Field	Reference
CONTINUATION RECORD SAME AS ABOVE	SAME PARAGRAPH AS ABOVE
CONT NR	5.16
APPL TYPE	5.91
NOTES (69)	5.61
RESERVED (14)	
FILE RECORD NUMBER	5.31
CYCLE	5.32

NOTES:

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.
(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 file 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:	1 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 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.
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.

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

Used On:	All records
Length:	1 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.

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, Airport and Heliport TAA, Company Routes, Enroute Airway Restrictions, Preferred Routes and 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.

5.0 NAVIGATION DATA - FIELD DEFINITIONS

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

Used On: All records
Length: 1 character
Character Type: Alpha

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

Figure 5-1
Section and Subsection Encoding Scheme

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.

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, Airport TAA, Path Point Flight Planning Arrival Departure Data, GLS Record, and Enroute Airway Restriction and Company Route to the Airport Identifier.

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, Heliport TAA, Path Point Flight Planning Arrival/Departure Data, GLS Records, and Enroute Airway Restriction and Company Route to the Airport Identifier.

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

5.0 NAVIGATION DATA - FIELD DEFINITIONS

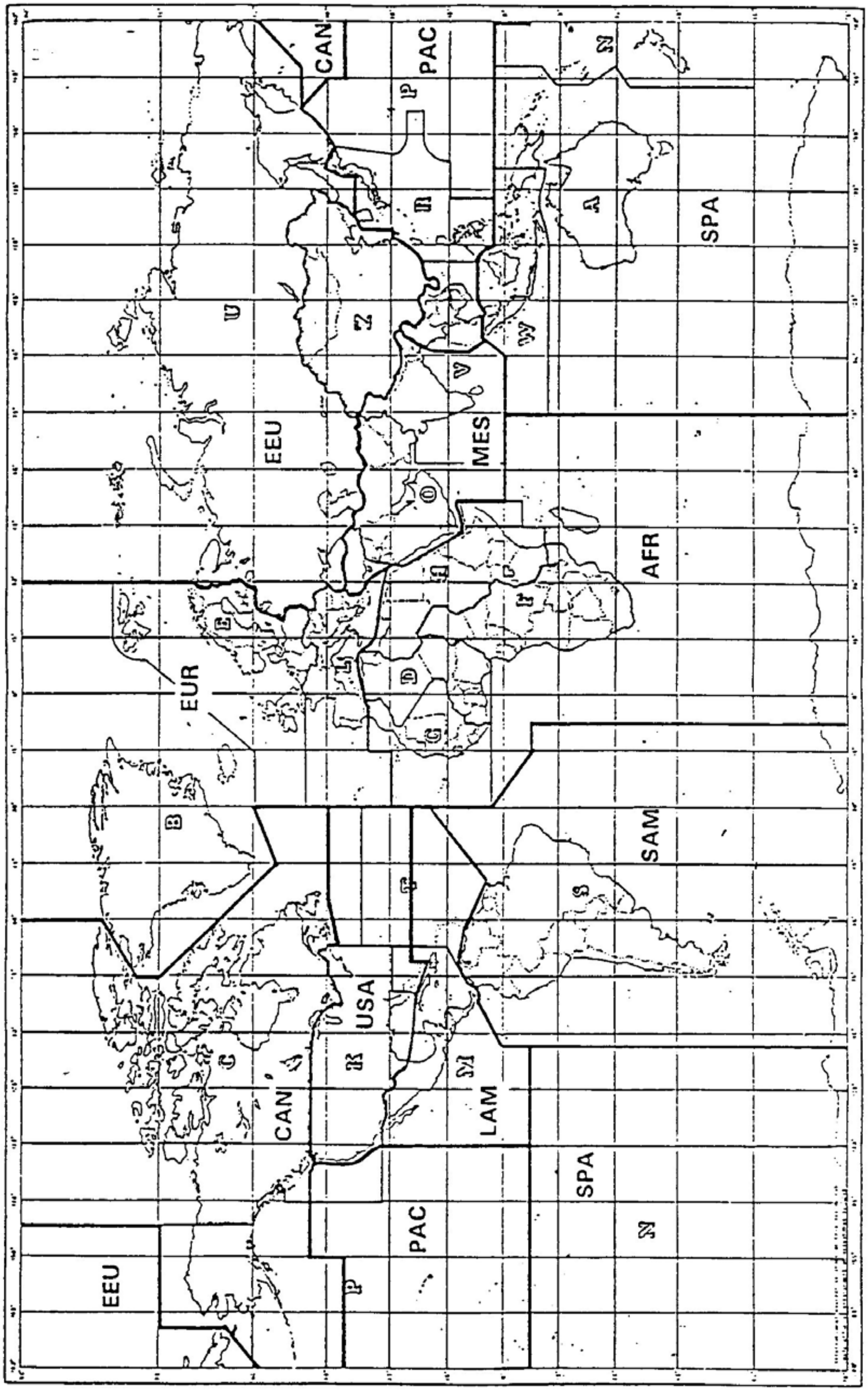

Figure 5-2
Geographical Area Codes

5.0 NAVIGATION DATA - FIELD DEFINITIONS

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."

Source/Content: The content of this field (for approach procedures) 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

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 (PACOTS)	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

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
Approach Transition	A
Localizer/Backcourse Approach	B
VORDME Approach	D
Flight Management System (FMS) Approach	F
Instrument Guidance System (IGS) Approach	G
Instrument Landing System (ILS) Approach	I
GNSS Landing System (GLS)Approach	J
Localizer Only (LOC) Approach	L
Microwave Landing System (MLS) Approach	M
Non-Directional Beacon (NDB) Approach	N
Global Positioning System (GPS) Approach	P
Non-Directional Beacon + DME (NDB+DME) Approach	Q
Area Navigation (RNAV) Approach (Note 1)	R
VOR Approach using VORDME/VORTAC	S
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

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

5.0 NAVIGATION DATA - FIELD DEFINITIONS

Airport Approach (PF) and Heliport (HF) Records – Route Type

Qualifier Description	Qualifier 1 Field Content (Note 1)	Qualifier 2 Field Content Note 2
DME Required for Procedure	D (Note 5)	
GPS (GNSS) required, DME/DME to RNP xx.x not authorized	J (Note 2)	
GBAS Procedure	L (Note 2)	
DME Not Required for Procedure	N (Note 5)	
GNSS Required	P	
GPS (GNSS) or DME/DME to RNP xx.x required	R (Note 2)	
DME/DME Required for Procedure	T (Note 2)	
RNAV, Sensor Not Specified	U (Note 2)	
VOR/DME RNAV	V (Note 2)	
RNAV Procedure that Requires FAS Data Block	W (Note 4)	
Primary Missed Approach		A (Note 6)
Secondary Missed Approach		B (Note 6)
Engine Out Missed Approach		E (Note 6)
Procedure without Straight-in Minimums		C (Note 3, 6)
Procedure with Straight-in Minimums		S (Note 3, 6)

Not all Qualifiers will apply to all Route Types, see notes below. Qualifier fields may be blank where their use is not required by source documentation.

Note 1: Qualifier 1 and 2 are carried on each sequence of every transition for Approach Procedure Coding (Approach Transition, Final Approach and Missed Approach) and will be identical for each sequence in a specific transition. Qualifier 2 will be different between Approach Transitions/Final approach coding where "S" or "C" will be used and Missed Approach where "A", "B" or "E" will be used (See Note 6).

Note 2: Route Type "R" is used for all types of RNAV procedure coding, excluding GLS Procedures that are coded as Route Type "J". The type of RNAV Procedure is further defined through the content of Qualifier 1.

a. Conventional Area Navigation Approach Procedures using RHO-RHO or RHO-THETA equipment are coded as Route Type "R" and Qualifier 1 of "T" or "V".

b. GNSS based RNAV Approach Procedures are coded as Route Type "R" with Qualifier 1 set to "J", "L", "R" or "U" as required by source publications and mapped to this table.

Note 3: In Approach Transition and Final Approach Coding, Qualifier 2 is set to "S" if the Approach Procedure is published with straight-in minimums or straight-in and circle-to-land minimums. Qualifier 2 is set to "C" if the Approach Procedure is published with circle-to-land minimums only. Qualifier 2 is required for all Route Types and is independent of the content of Qualifier 1.

Note 4: A Qualifier 1 value of "W" is used to indicate that the RNAV Procedure is authorized for SBAS only and requires the ARINC 424 Path Point with the Final approach Segment (FAS) Data Block. No other navigation senor is authorized for these procedures. Examples:

A RNAV (GPS) or RNAV (GNSS) Approach Procedure is authorized for SBAS navigation and requires the FAS Data Block. The Route Type would be coded as "R" and Qualifier 1 would be coded as "W". The associated GNSS/FMS Indicator (Section 5.222) would be set to indicate that SBAS is authorized. A Path Point Record carrying the FAS Data Block would be provided for the procedure. A Procedure Data Continuation Record would be provided and would be used to define the Levels of Service authorized and the official government source documentation Names for these Services.

A RNAV (GPS) or RNAV (GNSS) Approach Procedure is authorized for SBAS and also for single or multiple sensors other than SBAS. The Route Type would be coded as "R" and Qualifier 1 would be coded as "J" or "R", as appropriate. The setting of the GNSS/FMS Indicator would be appropriate to the level of authorization. A Path Point Record would or would not be provided, according to government source publications. A Procedure Data Continuation Record would be provided and would be used to define the Levels of Services authorized for SBAS and the official government source documentation Names for these Services.

A RNAV (GPS) or RNAV (GNSS) Approach Procedure is authorized for a single or multiple sensors other than SBAS; SBAS is not authorized. The Route Type would be coded as "R" and Qualifier 1 would be coded as "J", "R" "L", "U" or "P" as appropriate. The setting of the GNSS/FMS Indicator would be appropriate to the level of authorization. No Path Point Record would be provided. No Procedure Data Continuation Record would be provided.

Note 5: The Qualifier 1 codes of "D" and "N" are not used on RNAV Procedures (Route Type "R") of any kind. Additionally, these codes are not used in conjunction with Route Types that provide a "DME Option" of a procedure; specifically, they are not used in conjunction with the Route Types "D", "N", "Q", "S" or "V".

Note 6: The Qualifier 2 codes of "A", "B" and "E" can only be used in conjunction with a Route Type of "Z" = Missed Approach Coding. Qualifier 2 codes of "C" and "S" can be used in conjunction with any Route Type except "Z".

Used On:	Enroute Airways, Airport and Heliport SID/STAR/Approach, Preferred Route
Length:	1 character for Enroute Airways, Airport and Heliport SID and STAR and Preferred Routes. 3 characters for Airport and Heliport Approach primary records.
Character Type:	Alpha/numeric
Approach Examples:	LDC = a Localizer-based procedure, for localizer only, no glide slope, with DME required, Circle-To-Land Minimums. LNC= A Localizer-based procedure, for localizer only, no glide slope, DME not required, Circle-To-Land Minimums S S = A VOR procedure, using VORDME or VORTAC Navaid, the DME is not required for the procedure, the minimums are straight-in. S C = A VOR procedure, using VORDME or VORTAC Navaid, the DME is not required for the procedure, the minimums are Circle-To-Land D S = A VOR/DME procedure, using a VORDME or VORTAC Navaid, the DME is required for the procedure, the minimums are straight-in. V_S = A VOR procedure using VOR Navaid with only NAVAID, no DME installed, minimums are straight-in. V C = A VOR procedure, using a VOR Navaid with no DME capability, the minimums are Circle-To-Land N S = A NDB procedure, minimums are straight-in. Q S = A NDB + DME procedure, the DME is required, the minimums are straight-in.

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.

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.

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

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.

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

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

5.0 NAVIGATION DATA - FIELD DEFINITIONS

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:

Column	Contents	
1	Type of Approach-Alpha Character, generally the same as the first column of field 5.7 Route Type	
2-3	Runway Identification- Numeric in tens of degrees, valid range 01-36	
4	Runway Designation	
	- (dash)	Place holder if other runway designation codes are not present and multiple indicators required.
	L	Left
	R	Right
	C	Center
	T	Runway oriented to True North
	Blank	Position 5 and 6 must also be Blank
5	Multiple Indicator Alphanumeric or Blank	
6	Blank	

For Approach procedures that are not specific to a runway such as circle-to-land procedures a 4 character Alpha entry should be used with the fifth alphanumeric character used for multiple indicator if necessary.

For Helicopter Approach Procedures 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 character representing the runway designated or 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, Airport and Heliport TAA, and 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 I18L1, I18L2, N08T R35-Y, R35-Z
Circle-To-Land	VORA, VORB VOR-A, VOR-B, NDBB,CVOR, VDMA, LOCD,BI P168, NDAT (NDB, DME, Alpha, True), NDB-1, NDB-2
Helicopter to Runway	I13L, L040, V175, N175B
Helicopter to Helipad	IA127 = ILS Procedure to a pad designated A127 VBRAVO =VOR Procedure to a Pad designated BRAVO N23 =NDB Procedure to a Pad designated 23 RWESTA RNAV Procedure to a Pad designated West Alpha

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

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

Figure 5-3
Transition Identifier Field Content

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 8 or M will carry a blank transition identifier field.

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.

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.

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

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

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 records used to define a complete condition, the "Sequence Number" is used to define each primary record in the sequence. For Airport and Heliport TAA Records – Sequence Number 1 will always be assigned to the record based on the Center Fix upon which the Straight-In Area is predicated, Sequence Number 2 will always be assigned to the record based on the Center Fix upon which the Left Base Area is predicated, and Sequence Number 3 will always be assigned to the record based on the Center Fix upon which the Right Base Area is predicated. Therefore, if a TAA Record has a Straight-In Area and a Right Base Area, but no Left Base Area, only Sequence Numbers 1 and 3 will be used. If a TAA Record has a Straight-In Area and a Left Base Area but no Right Base Area, only Sequence Numbers 1 and 2 will be used.

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.

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.

Used On:	Enroute Airways, Airport and Heliport MSA Records, Airport and Heliport TAA Records, 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 - MSA Table, TAA Table, 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.

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.

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

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.

Used On:	All records except Company Route, Airport Localizer Marker/Locator, Enroute Markers, Cruising Tables, FIR/UIR and Grid MORA
Length:	1 character
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.

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.

Waypoint Description	Enroute, STAR,APRCH for the line "Airport as Waypoint"	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

5.0 NAVIGATION DATA - FIELD DEFINITIONS

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

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

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

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

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

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

6. A fly-over waypoint (including Navaid) specified by the procedure: (a) at the end of a SID or STAR Route Type; (b) at the end of an Approach Transition for FMS, GPS, or MLS/RNAV approach; or (c) at the missed approach point in an Approach Procedure.

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

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

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

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

13. Any waypoint (including Navaid) established as an Intermediate Approach Fix and not coded as a Final Approach Course Fix. See 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 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 fix is published but yet required, one established by a data supplier according to the rules in Attachment 5. See Special Navigation Terms in Section 2.

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 Special Navigation Terms in Section 2.

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.

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").

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, refer 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.

Used On	Airport and Heliport SID/STAR/Approach, Enroute Airway Records
Length:	4 Characters
Character Type:	Alpha

5.0 NAVIGATION DATA - FIELD DEFINITIONS

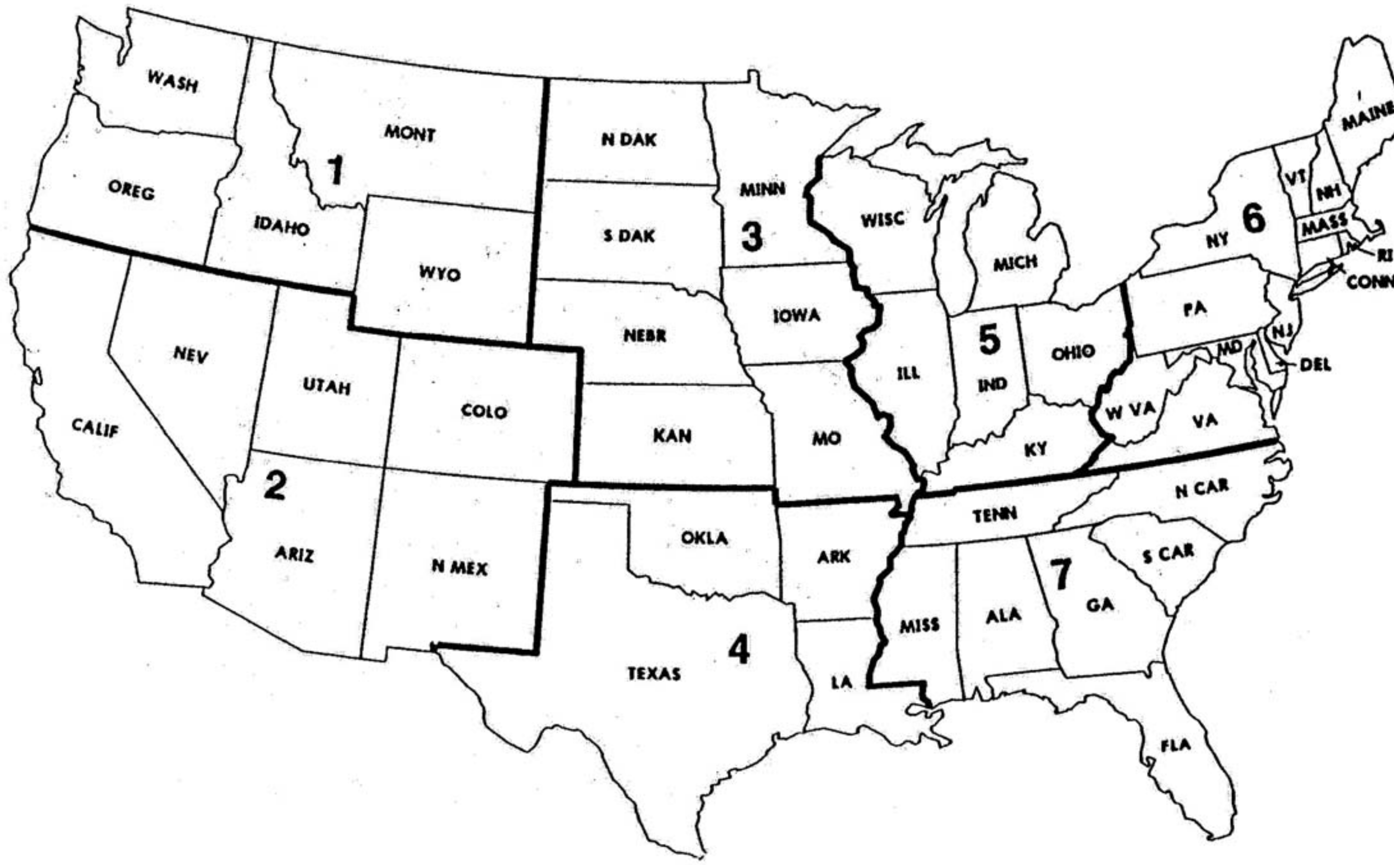

Figure 5-5
7 Subdivisions for United States

5.0 NAVIGATION DATA - FIELD DEFINITIONS

5.18 Boundary Code (BDY CODE)

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

Source/Content: See Table 5-6.

Used On: Enroute Airways records
Length: 1 character
Character Type: Alpha/numeric

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

*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

Used On: Enroute Airway, Preferred Routes, Restrictive Airspace, and Controlled Airspace records
Length: 1 character
Character Type: Alpha

5.20 Turn Direction (TURN DIR)

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.

Used On: Airport and Heliport SID/STAR/Approach records
Length: 1 character
Character Type: Alpha

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.

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 SID/STAR/Approach records
Length: 2 characters
Character Type: Alpha

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.

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 Section 5.20.

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

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, TACAN, GLS and MLS Navaids may be referenced.

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:

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. Localizers, GLS Reference Path, and MLS Azimuth are used as Recommended Navaids 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. The Recommended Navaid in Airport and Heliport Records will be any VOR, VORDME, TACAN or VORTAC available in the database.

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

5.0 NAVIGATION DATA - FIELD DEFINITIONS

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 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
Examples: P, PP, DEN, LAX, ILAX, MJFK

<table>
<tr><th>Facility Type / Procedure Use</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 Procedure</th><th>Localizer Final Approach Coding & Transitions of course or heading to intercept localizer</th><th>VORDME/VORTAC Final Approach</th><th>VOR Only Final Approach Coding & Single Record Transitions</th><th>NDB Only Final Approach Coding</th><th>NDB + DME Final Approach Coding</th><th>TACAN Final Approach Coding</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>[2]
| X</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>[2]
| X</td><td>|</td><td>X
|</td></tr>
<tr><td>Localizer Theta/Rho</td><td>|</td><td>X
|</td><td>X
|</td><td>|</td><td>|</td><td>X
|</td><td>X
X | X</td><td>|</td><td>|</td><td>|</td><td>|</td><td>|</td><td>|</td></tr>
<tr><td>VOR Theta/Rho</td><td>|</td><td>X
|</td><td>X
X |</td><td>|</td><td>|</td><td>X
|</td><td>|</td><td>|</td><td>X
X |</td><td>|</td><td>|</td><td>|</td><td>X
|</td></tr>
<tr><td>DME Theta/Rho</td><td>|</td><td>|</td><td>|</td><td>X
|</td><td>X
| X</td><td>X
|</td><td>|</td><td>|</td><td>|</td><td>|</td><td>[2]
| X</td><td>|</td><td>|</td></tr>
<tr><td>TACAN Theta/Rho</td><td>X | X</td><td>X
X | X</td><td>X
|</td><td>X
|</td><td>X
| X</td><td>X
X | X</td><td>|</td><td>|</td><td>|</td><td>|</td><td>[2]
| X</td><td>X
X | X</td><td>X
|</td></tr>
<tr><td>NDB Theta/Rho</td><td>|</td><td>X
|</td><td>|</td><td>|</td><td>|</td><td>X
|</td><td>|</td><td>|</td><td>|</td><td>X
|</td><td>[1]
|</td><td>|</td><td>|</td></tr>
</table>

[1] On FACF and FAF Records

[2] On Runway/MAP Records Only

Figure 5-7 Procedure Use

5.0 NAVIGATION DATA – FIELD DEFINITIONS

5.24 Theta (THETA)

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.

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

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.

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.

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.

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 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
Length:	4 characters
Character Type:	Alpha/numeric
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.

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
Length:	4 characters
Character Type:	Distance - Numeric; Time - Alpha/numeric
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.

The "HX" group of Path Terminator codes is 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 is included in the "Outbound Magnetic Course" field of such records.

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.

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

5.29 Altitude Description (ALT DESC)

Definition/Description: The "Altitude Description" 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. The field is also used to designate recommended altitudes and cases where two distinct altitudes are provided at a single fix.

Source/Content: A code from the following table, selected based on official government source or coding rules in Attachment 5 to this document.

Field Content	Waypoint Crossing Description
+ (plus)	"At or above" altitude specified in first "Altitude" field. Also used with Localizer Only Altitude field.
- (minus)	"At or below" altitude specified in first "Altitude" field. Also used with Localizer Only Altitude field.
@ (blank)	"At" altitude specified in first "Altitude" field. Also used with Localizer Only 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) specified in the second "Altitude" field and "at" altitude specified in the first "Altitude" field on the FAF Waypoint in Precision Approach Coding with electronic Glide Slope.
H	Glide Slope Altitude (MSL) specified in second "Altitude" field and "at or above" altitude specified in first "Altitude" field on the FAF Waypoint in Precision Approach Coding with electronic Glide Slope
I	Glide Slope Intercept Altitude specified in second "Altitude" field and "at" altitude specified in first "Altitude" field on the FACF Waypoint in Precision Approach Coding with electronic Glide Slope
J	Glide Slope Intercept Altitude specified in second "Altitude" field and "at or above" altitude specified in first "Altitude" field on the FACF Waypoint in Precision Approach Coding with electronic Glide Slope
V	"At" altitude on the coded vertical angle in the second "Altitude" field and "at or above" altitude specified in first "Altitude" field on step-down fix waypoints.
X	"At" altitude on the coded vertical angle in the second "Altitude" field and "at" altitude specified in the first "Altitude" field on step-down fix waypoints.
Y	"At" altitude on the coded vertical angle in the second "Altitude" field and "at or below" altitude specified in the first "Altitude" field on step-down fix waypoints.

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 for Precision Approach Procedures with electronic Glide Slope the codes "@ (for blank)," "G," "H," "I," and "J," are applied as indicated in the table above. For more detail refer to procedure coding rules in Attachment 5 of this Specification.

Note Codes "I" and "J" are only used when the first altitude for the FACF fix is not blank. If that altitude is blank, the Altitude Description is also blank, even when the second altitude is not blank.

Note: The codes "V," "X" and "Y" are used with all fixes defined in government source as step-down fixes and from the FACF inbound on final approach coding. There can be two altitudes provided on every fix in final approach coding. Altitude 1 is the altitude and constraint specified at the fix, the so-called "procedure altitude." Altitude 2 is the "at" altitude on the coded vertical path at the fix. See rules for fix altitude coding in Attachment 5 of this Specification.

Note: Localizer Only Altitude information is provided in the Approach Continuation Record for Precision Approach Procedures with electronic Glide Slope using the codes for "At," "At or Above" and "At or Below" appropriately based on government source publications. This Altitude is the non-precision altitude at the fix on which it is coded. Provided on FAF and step-down fix waypoints**.**

Used On: Airport and Heliport SID/STAR/Approach, Primary and Continuation Records, Airport, Heliport and Enroute Communications, VHF NAVAID Limitation Continuation, Preferred Routes and Flight Planning Arrival/Departure Data Records.
Length: 1 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) altitudes at fixes in terminal procedures and 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. This specification includes specific rules for altitude provision and when those altitudes are not provided by source documents, they will be included by data suppliers according to those rules. 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 one of the following characters: "B," "G," "H," or "V." The first "Altitude" field may contain an altitude when the "Altitude Description" field contains a "I" or "J" or when it is blank. The second "Altitude" field will contain an altitude when the "Altitude Description" field contains one of the following characters: "B," "C," "G," "H," "I," "J," or "V." In approach procedure coding, some fix "Altitudes" may be below sea level, specifically altitudes at runway fixes when the runway threshold elevation is below sea level. In these cases, the "Altitude" will be expressed in feet with a minus (-) sign in the first character of the five-character field, see examples.

On Airport and Heliport SID/STAR/Approach Continuation Records, the "Localizer Only Altitude" field will contain an altitude when there is a non-precision altitude at the fix that is associated with using the ILS procedure as a Localizer Only (Glide Slope out) procedure. Such an altitude may be provided for the Final Approach Fix (FAF) or any step-down fix from the FACF inbound on the final approach course.

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, Primary and Continuation Records, Holding Pattern, Enroute Airway, Preferred Routes.
Length:	5 characters
Character Type:	Alpha/numeric
Examples:	05000, FL050, 18000, FL180 00600, -0012, 29000, FL290, UNKNN or NESTB (the last two on Enroute Airways only)

5.31 <u>File Record Number (FRN)</u>

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 file being assigned the number 00001, the second the number 00002, and so on through the final record on the file. File record numbers are subject to change at each file update.

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 <u>Cycle Date (CYCLE)</u>

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.

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 <u>VOR/NDB Identifier (VOR IDENT/NDB IDENT)</u>

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

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

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

5.0 NAVIGATION DATA – FIELD DEFINITIONS

5.34 VOR/NDB Frequency (VOR/NDB FREQ)

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

5.35 NAVAID Class (CLASS)

Definition/Description: The “Navaid Class” field provides information in coded format on the type of navaid, the useable range or assigned output power of the navaid, information carried on the navaid signal and collocation of navaids in both an electronic and aeronautical sense. The field is made up of five columns of codes that define this information.

Source/Content: The information for the five columns is derived from official government source. The mapping of the information codes to the output record columns for the various types of navaids is contained in the tables below.

Used On: Navaid Records (VHF, NDB and Airport/Heliport Localizer/Markers/Locators)
Length: 5 characters (including “blanks”)
Character Type: Alpha

VHF Navaid Record – Includes VOR, VORDME, VORTAC, TACAN, ILSDME and MLSDME type navaids, Output Record Section/Subsection D

	Col 28	Col 29	Col 30	Col 31	Col 32
Facility	Navaid Type 1	Navaid Type 2	Range/ Power	Add Info	Col-location
VOR	V				
DME		D			
TACAN (channels 17-59 & 70-126)		T			
MIL TACAN (channels 1-16 & 60-69)		M			
ILS/DME		I			
ILS/TACAN		I			
MLS/DME/N		N			
MLS/DME/P		P			
Range/Power					
Terminal			T		
Low Altitude			L		
High Altitude			H		
Undefined			U Note 3		
ILS/TACAN			C Note 4		
Additional Information					
Biased ILSDME or ILSTACAN				D	
Automatic Transcribed Weather Broadcast				A	
Scheduled Weather Broadcast				B	
No Voice on Frequency				W	
Voice on Frequency				Blank	
Collocation					
Collocated Navaids					Blank
Non-Collocated Navaids					N Note 1

5.0 NAVIGATION DATA – FIELD DEFINITIONS

NDB Navaid Record –NDBs and Terminal NDBs, Output Record Section/Subsection DB and PN

	Col 28	Col 29	Col 30	Col 31	Col 32
Facility	Navaid Type 1	Navaid Type 2	Range/ Power	Add/ Info	Col-location
NDB	H				
SABH	S				
Marine Beacon	M				
Inner Marker		I			
Middle Marker		M			
Outer Marker		O			
Back Marker		C			
Range Power					
200 Watts or More			H		
50 to 1999 Watts			Blank		
25 to Less Than 50			M		
Less Than 25			L		
Additional Information					
Automatic Transcribed Weather Broadcast				A	
Scheduled Weather Broadcast				B	
No Voice on Frequency				W	
Voice on Frequency				Blank	
Collocation					
BFO Operation					B Note 5

Airport/Heliport Localizer Marker/Locator Record –NDB Locator and Marker Navaids, Output Record Section/Subsection PM

	Col. 75	Col. 76	Col. 77	Col. 78	Col. 79
Facility	Navaid Type 1	Navaid Type 2	Range/ Power	Add Info	Col-location
NDB	H				
SABH	S				
Marine Beacon	M				
Inner Marker		I			
Middle Marker		M			
Outer Marker		O			
Back Marker		C			
Range/Power					
200 Watts or More			H		
50 to 1999 Watts			Blank		
25 to Less Than 50			M		
Less Than 25			L		
Additional Information					
Automatic Transcribed Weather Broadcast				A	
Scheduled Weather Broadcast				B	
No Voice on Frequency				W	
Voice on Frequency				Blank	
Collocation					
BFO Operation					B Note 5
Locator/Marker Collocated					A Note 2
Locator/Middle Marker Not Collocated					N Note 2

Note 1: Collocations: For VHF Navaid records, the character “N” in column 32 is entered if either the latitude and/or the longitude of the VOR and the Collocated DME or TACAN of a frequency paired VORDME or VORTAC differ by 1/10 arc minutes or more. Column 32 is “blank” on VHF Navaids where the difference in latitude or longitude is less than the 1/10-arc minutes. Column 32 of the VHF Navaid will also carry the “N” or “blank” meaning listed above for frequency paired ILSDMEs and ILSTACANs. Note that in this later case, the character is carried on the ILSDME or ILSTACAN record as the Localizer record is not part of the VHF Navaid Section.

Note 2: Collocation: For Airport/Heliport Localizer Marker/Locator records, the character “N” in column 79 is entered if either the latitude or longitude of a Marker and it aeronautically associated Locator differ by 1/10-arc minutes or more. The character “A” in column 79 is entered if the latitude or longitude of a Marker and its aeronautically associated Locator differ by less than 1/10-arc minutes. Column 79 is left “blank” when the latitude and longitude of the Marker and Locator are exactly the same.

Note 3: VHF Navaid Records, Range/Power. The character "U" is entered into column 30 on VHF Navaid Records when the official government source has not defined the use of the facility or has not restricted such use by range or altitude.

Note 4: VHF Navaid Records, Range Power. The character "C" is entered into column 30 when that records contains a TACAN Navaid that is frequency paired with an ILS Localizer with the same identifier at the same location. The character is only used in combination with the character "I" in column 29. If the "C" appears in column 30, the Range is understood to be "T" = Terminal use. Note that in some output files, this TACAN Navaid may be listed twice, once as a TACAN and once as an ILSTACAN, depending on the individual government source publication.

Note 5: NDB Navaids, Airport/Heliport Localizer Marker/Locator Navaids, BFO Operations. While not a "collocation" indication, the character "B" is entered in the Collocation Columns (32 of NDB Navaids and 79 of Airport/Heliport Localizer Marker/Locator Navaids) to indicate the type of signal emitted by the Navaid requires the use of a Beat Frequency Oscillator (BFO) to make the morse identifier transmission audible. Should both a collocation and a BFO condition exist for one and the same Navaid Record, preference is given to the collocation characters.

5.36 Latitude (LATITUDE)

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

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.

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.

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.
Length:	10 characters
Character Type:	Alpha/numeric
Examples:	W104450794

5.0 NAVIGATION DATA – FIELD DEFINITIONS

Record File	Lat/Long Field	Location Defined
Airport	Airport	Aerodrome Reference Point
Airport Comm	Comm (Note 7)	Transmitter Antenna
Enroute Comm	Comm (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 (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 (Note 1)	VOR Antenna
VHF Navaid	DME or TACAN (Note 2)	DME or TACAN Antenna
Runway	Runway (Note 5)	Runway Landing Threshold
Waypoint	Waypoint	Waypoint
MLS	Azimuth	Azimuth Antenna
MLS	Elevation	Elevation Antenna
MLS	Back Azimuth (Note 3)	Back Azimuth Antenna
MLS	Datum (Note 4)	MLS Reference Datum Point

Figure 5-8

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.

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.

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.

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)

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.

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.
Length: 5 characters
Character Type: Alpha/numeric
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.

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

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.

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)

Definition/Description: The "Waypoint Type" field defines both the "type" and function of IFR waypoints and also define a waypoint as being VFR.

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		
NDB Navaid as Waypoint	N	Note 1	Note 2
Named Intersection	R		
Uncharted Airway Intersection	U		
VFR Waypoint	V	Note 4	
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 in the FAA National Reference System		E	
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	
Pitch and Catch Point in the FAA High Altitude Redesign		P	
AACAA and SUA Waypoints in the FAA High Altitude Redesign		S	
FIR/UIR or Controlled Airspace Intersection		U	
Latitude/Longitude Intersection, Full Degree of Latitude		V	
Latitude/Longitude Intersection, Half Degree of Latitude		W	

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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		
Middle Marker as Waypoint	M		
Terminal NDB Navaid as Waypoint	N	Note 1	Note 2
Outer Marker as Waypoint	O		
Named Intersection	R		
VFR Waypoint	V	Note 4	
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	

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

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

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.

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

Note 4: The code V in column 27 for VFR Waypoints is not used in conjunction with any codes from column 28 and 29.

5.43 Waypoint Name/Description (NAME/DESC)

Definition/Description: The "Waypoint Name/Description" field sets the unabbreviated name of a named waypoint or a 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.

Used On: Enroute Waypoints, Airport and Heliport Terminal Waypoints.
Length: 25 characters max
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 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.

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.

Used On: Airport and Heliport ILS Localizer records
Length: 5 characters
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.

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 = 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)

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.
Length: 5 characters max
Character Type: Alpha/numeric
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. 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
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.

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: 1 character
Character Type: Alpha

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.

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

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.

Used On:	ILS, GLS and MLS records
Length:	3 characters
Character Type:	Numeric
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.

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 "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.

Used On:	Airport and Heliport SID/STAR/Approach, Airport and Heliport Records
Length:	5 characters
Character Type:	Numeric
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.

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.

Used On:	Airport Records
Length:	3 characters
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

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 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
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.

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
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.

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

5.60 Name (NAME)

Definition/Description: The "Name" field defines the name commonly applied to the navigation entity defined in the record.

Source/Content: Appropriate contents for the field will be determined from official government or customer sources.

Used On: Gate and Holding Pattern records
Length: 25 characters max
Character Type: Alpha/numeric
Examples: HOLDING JIMEE MIAMI

5.61 Notes (Continuation Records) (NOTES)

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

5.62 Inbound Holding Course (IB HOLD CRS)

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

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
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.

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

Used On: Holding Pattern records
Length: 1 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 (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.

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 (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

5.0 NAVIGATION DATA – FIELD DEFINITIONS

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.

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.

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

Used On: VHF NAVAID and ILS records
Length: 5 characters
Character Type: Alpha/numeric
Examples: E0072, E0000, T0000, G0000

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.

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. As provided on Runway Records, the TCH value will be the Glide Slope Height at the landing threshold for runways with ILS or MLS approaches. If an ILS or MLS is not available and an RNAV approach is available it will be the published TCH for that procedure. When ILS/MLS or RNAV values are not available but a published VGSI with TCH is available, it will be used. If none of these values are available, it will be 50 feet. When used on Approach Continuation Records, the field will contain the published TCH for that procedure. When used on ILS or MLS Records, it will be the height of the glide slope at the landing threshold.

COMMENTARY

Based on the information contained in the Source/Content paragraph, it should be noted that the single TCH value provided on the Runway Record may be different than the TCH value provided on the Approach Continuation Record for a procedure to that same runway. These differences may be significant. A comparison of procedure altitude data to threshold elevation and threshold crossing heights should only be made to the Approach Continuation Record. It should also be noted that a TCH associated with the VGSI for the same runway may be different than either value. Some government sources will provide information on these procedure to VGSI differences when they are three feet or greater

Used On: Airport and Heliport ILS and MLS Runway, Airport, and Heliport Approach Continuation Records.
Length: 2 characters on Airport and Heliport ILS, MLS and Runway Records
3 characters on Airport and Heliport Approach Continuation Records
Character Type: Numeric
Example 37, 50, 99 (ILS, MLS and Runway
044, 055, 102, (Approach)

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.

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

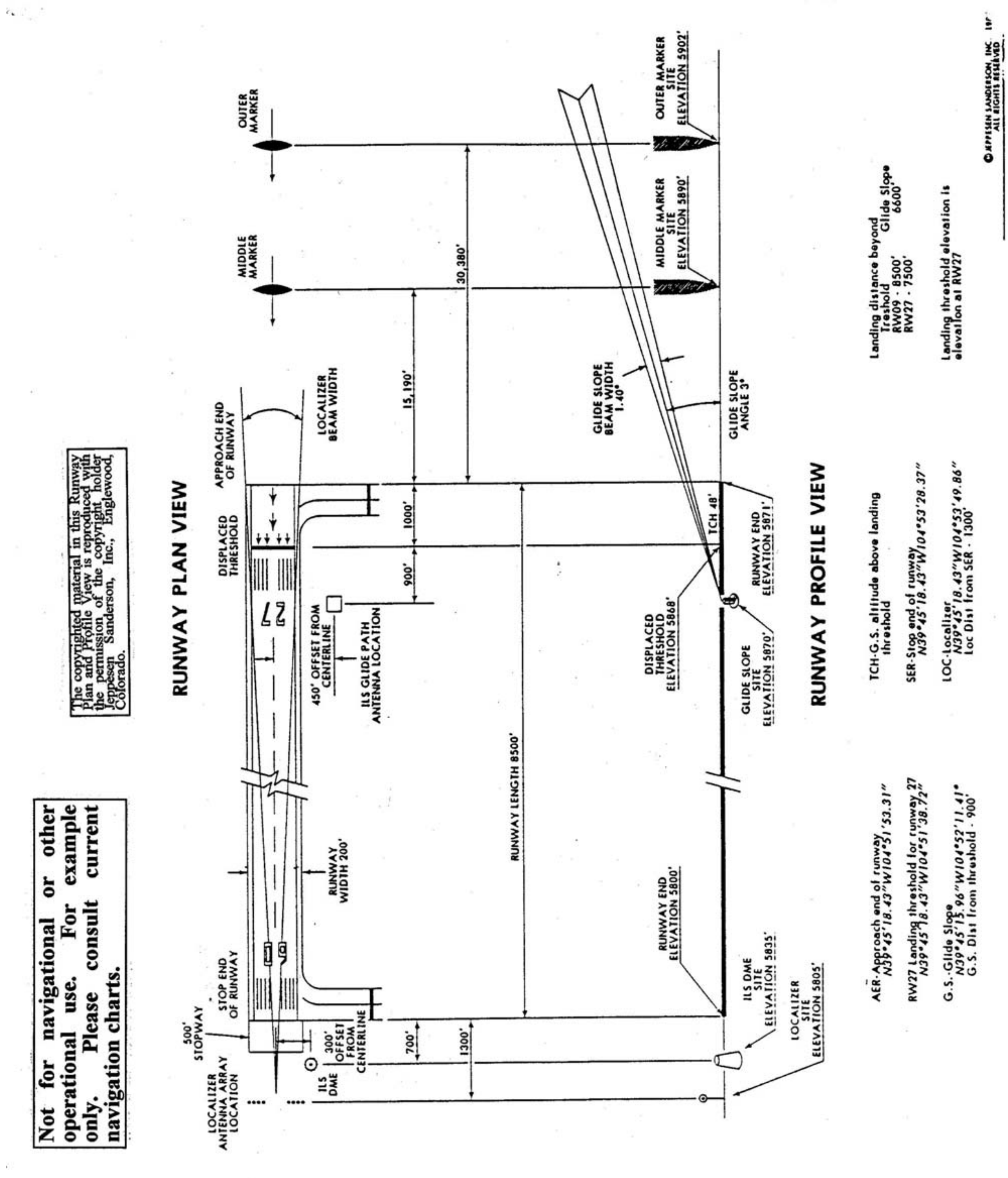
Not for navigational or other operational use. For example only. Please consult current navigation charts.
The copyrighted material in this Runway Plan and Profile View is reproduced with the permission of the copyright holder Jeppesen Sanderson, Inc., Englewood, Colorado.
RUNWAY PLAN VIEW
RUNWAY PROFILE VIEW
LOCALIZER ANTENNA ARRAY LOCATION
ILS DME
500' STOPWAY
STOP END OF RUNWAY
300' OFFSET FROM CENTERLINE
700'
1300'
RUNWAY WIDTH 200'
RUNWAY LENGTH 8500'
450' OFFSET FROM CENTERLINE
ILS GLIDE PATH ANTENNA LOCATION
900'
1000'
DISPLACED THRESHOLD
APPROACH END OF RUNWAY
LOCALIZER BEAM WIDTH
15,190'
30,380'
MIDDLE MARKER
OUTER MARKER
LOCALIZER SITE ELEVATION 5805'
ILS DME SITE ELEVATION 5835'
RUNWAY END ELEVATION 5800'
GLIDE SLOPE SITE ELEVATION 5870'
DISPLACED THRESHOLD ELEVATION 5868'
RUNWAY END ELEVATION 5871'
TCH 48'
GLIDE SLOPE ANGLE 3°
GLIDE SLOPE BEAM WIDTH 1.40°
MIDDLE MARKER SITE ELEVATION 5890'
OUTER MARKER SITE ELEVATION 5902'
AER-Approach end of runway N39°45'18.43"W104°51'53.31"
RW27 Landing threshold for runway 27 N39°45'18.43"W104°51'38.72"
G.S.-Glide Slope N39°45'15.96"W104°52'11.41" G.S. Dist from threshold - 900'
TCH-G.S. altitude above landing threshold
SER-Stop end of runway N39°45'18.43"W104°53'28.37"
LOC-Localizer N39°45'18.43"W104°53'49.86" Loc Dist from SER - 1300'
Landing distance beyond Treshold Glide Slope
RW09 - 8500' 6600'
RW27 - 7500'
Landing threshold elevation is elevation at RW27
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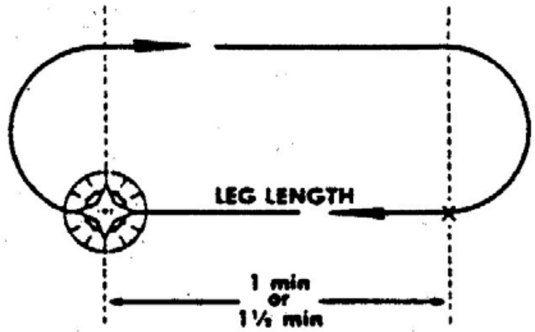
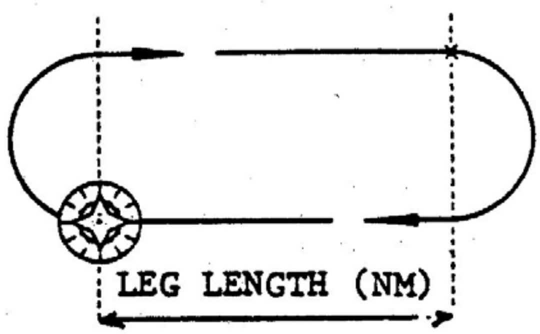
Figure 5-9

5.0 NAVIGATION DATA – FIELD DEFINITIONS



LEG LENGTH (TIME)



LEG LENGTH (DISTANCE)

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.

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)

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 then descend on the angle, projected back from the fix and altitude code for that fix 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. In coding of procedures with navaids providing an electronic glide slope, the Vertical Angle is the angle assigned to that glide slope. In coding of procedures with a published VNAV Angle, it is that angle or one calculated by the data supplier. In coding of procedures with no government source vertical angle data, it is always a data supplier calculated value; see Attachment Five, Procedure Coding Rules. The angles are expressed in degrees, tenths and hundredths of a degree, with the decimal point suppressed. The Localizer Only Vertical Angle is a value provided for non-precision use of an ILS procedure as a Localizer Only (Glide Slope Out) procedure.

Used On:	Airport and Heliport STAR/Approach Records
Length:	4 characters
Character Type:	Alpha/numeric
Examples:	-300, -375, -542, -969 (max angle is 9.99 degrees)

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.

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

5.72 Speed Limit (SPEED LIMIT)

Definition/Description: The “Speed Limit” field defines a speed, expressed in Knots, Indicated (K.I.A.S.), for a fix in a terminal procedure or for an airport or heliport terminal environment.

Source/Content: The speed limit will be derived from official government source documentation and shown in Knots. When used on an Airport or Heliport Record, the field is an indication of the maximum allowed speed and applies to all flight segments departing or arriving that airport’s or heliport’s terminal area, at and below the specified Speed Limit Altitude (5.73). When used on Airport and Heliport SID/STAR/Approach Records, the field is an indication of a speed for a fix in the procedure description, used in conjunction with Speed Limit Description (5.261).

On SID Procedure Records, the speed limit will apply to all legs up to and including the termination of the leg on which the speed is coded from the beginning of the procedure or a previous speed limit. If a different speed is coded on a subsequent leg, the limit will be applied for that leg and from that leg backwards to the previous terminator which contained a speed limit.

On STAR and Approach Procedure Records, the speed limit will be applied forward to the end of the arrival (e.g. throughout the procedure until the end of the Flight Plan) or until superceded by another speed limit.

The intent in both SIDs and STARs is to exclude speed changes inconsistent with the procedure

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.

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.

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
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.

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

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

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.

Source/Content: The code to be entered must 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

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

Used On: Company Route and Preferred Route records
Length: 3 characters
Character Type: Alpha/numeric

Note: Figure 5-11 illustrates how various fields are to be completed in the Company Route Record based on the various "VIA Codes" defined in this paragraph.

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

Figure 5-11
Company Route Record (R)
Field Content

5.0 NAVIGATION DATA - FIELD DEFINITIONS

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 (Section 5.77).

Source/Content: For Company Route records this field can contain the SID/STAR, Approach, Enroute Airway, or Preferred Route Identifier (Sections 5.8, 5.9, and 5.10). For Preferred Route records this field can contain the SID/STAR or Enroute Airway Route Identifier (Section 5.8). This field will be blank for certain records depending on the "VIA" field content (Section 5.77).

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

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.

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/MLS/GLS 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 minimal 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.

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.

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

Used On: Runway, Localizer, MLS and MLS Continuation Records, GLS Record.
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.

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.

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

5.82 Waypoint Usage

Definition/Description: The waypoint usage field is employed to indicate the structure in which the waypoint is utilized.

Source/Content:

Usage	Record Column Content	
	30	31
HI and LO Altitude		B
HI Altitude		H
LO Altitude		L
Terminal Use Only		Blank
RNAV	R	

Used On: Enroute (EA) waypoint records
Length: 2 characters
Character Type: Alpha

5.83 To FIX

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 (Section 5.78), or terminate a "Direct" segment or start an "Initial" segment 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 (Section 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.

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":

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: This 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 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.

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
Length: 3 characters
Character Type: Numeric
Examples: 001, 011, 999

5.90 ILS/DME Bias

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
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: The field will contain one of the following type codes:

Field Content	Description
A	A standard ARINC Continuation containing notes or other formatted data
B	Combined Controlling Agency/Call Sign and formatted Time of Operation
C	Call Sign/Controlling Agency Continuation
E	Primary Record Extension
L	VHF Navaid Limitation Continuation
N	A Sector Narrative Continuation
T	A Time of Operations Continuation, "formatted time data"
U	A Time of Operations Continuation "Narrative time data"
V	A Time of Operations Continuation, Start/End Date
P	A Flight Planning Application Continuation
Q	A Flight Planning Application Primary Data Continuation
S	Simulation Application Continuation
W	An Airport or Heliport Procedure Data Continuation with SBAS use authorization information

Used On: Continuation Records
Length: 1 character
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.

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

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					
Collocated with Localizer Note 3 Collocated with Glide Slope Not cllocated 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					
Collocated with Azimuth Collocated with Elevation Not Collocated with Azimuth or Elevation					A E N
MLS Approach Azimuth Scan Rate				Note 4	

Used On: ILS Marker Primary records, VHF Navaid, NDB Navaid and ILS/MLS continuation records
Length: 5 characters
Character Type: Alpha/numeric

Note 1: 0=A0, 1=A1, 2=A2

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.

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.

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.

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.

Used On: ILS Continuation, MLS Continuation and Runway Continuation records
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.

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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 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 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 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
Character Type:	Alpha

5.100 Minor Axis Bearing (MINOR AXIS TRUE BRG)

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
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.

Source/Content: The field will contain one of the following entries:

Field Content	Description	Airport Heliport Comm Only	Enroute Comm Only	Both Comm Type
ACC	Area Control Center			X
ACP	Airlift Command Post	X		
AIR	Air to Air	X		
APP	Approach Control	X		
ARR	Arrival Control	X		
ASO	Automatic Surface Observing System (ASOS)	X		
ATI	Automatic Terminal Info Service (ATIS)	X		
AWI	Airport Weather Information Broadcast (AWIB)	X		
AWO	Automatic Weather Observing Service (AWOS)			X
AWS	Aerodrome Weather Information Services (AWIS)	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		
EFS	Enroute Flight Advisory Service (EFAS)		X	
EMR	Emergency			X
FSS	Flight Service Station			X
GCO	Ground Comm Outlet	X		
GND	Ground Control	X		
GTE	Gate Control	X		
HEL	Helicopter Frequency	X		
INF	Information			X
MIL	Military Frequency			X
MUL	Multicom			X
OPS	Operations	X		
PAL	Pilot Activated Lighting (Note 1)	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	

Note 1: The Comm Type PAL is used only when the frequency(s) published are used exclusively for the activation of airport lighting. If the pilot activation of airport lighting is accomplished on a frequency that is also used for voice communications, the Pilot Controlled Lighting parameter of the Service Indicator is used.

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".

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.

Source/Content: Content is derived from official government sources. The following details apply:

HF frequencies are provided as five significant digits in kilohertz for 10 thousands, thousands, hundreds, tens and units. The remaining two positions of the seven-character field is zero filled.

Example: The HF frequency of 17955 kHz would be expressed as 1795500. The HF frequency of 8965 kHz would be expressed as 0896500.

VHF frequencies with 100, 50 or 25 kilohertz spacing are provided as three significant digits and three decimals in megahertz for hundreds, tens, units, tenths, hundredths and thousandths. The remainder of the seven-character field is zero filled.

Example: The VHF frequency of 118.50 MHz would be expressed as 0118500. The VHF frequency of 131.275 MHz would be expressed as 0131275.

UHF frequencies are provided as three significant digits and two decimals in megahertz for hundreds, tens, units, tenths and hundredths. The remainder of the seven-character field is zero filled.

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Example: the UHF frequency of 267 MHz would be expressed as 0026700. The UHF frequency of 287.5 MHz would be expressed as 0028750.

VHF frequencies with 8.33 kHz spacing are provided as four significant digits and three decimals for the assigned channel number. The actual frequency (which would be three significant digits and four decimal places) is not provided.

Example: The VHF frequency of 132.0583 MHz will be provided as the channel number 132.060, expressed in seven digits as 0132060.

The decimal point is always suppressed. As all of these numeric expressions look alike, the "Frequency Units" field (Section 5.104) is provided to assist in actual frequency determination.

Used On: Enroute, Airport and Heliport Communications Records
Length: 7 characters
Character Type: Numeric

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" (Section 5.103) field as indicated in the table or will designate the content of the "Communications Frequency" field as a channel.

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)
C	Communication Channel for 8.33kHz spacing

Used On: Enroute, Airport and Heliport Communications records
Length: 1 character
Character Type: Alpha

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 Communication records, the Call Name will be shown with the first record only of any Flight Information Region or Flight Service Station.

Used On: Airport, Enroute Communications records
Length: 25 characters
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)

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:

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	
Air/Air		R	
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

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ENROUTE COMMUNICATIONS RECORDS

Description	Column Content		
	57	58	59
Aeronautical Enroute Information Service (AEIS)	A		
Flight Information Service (FIS)	F		
Air/Ground		A	
Discrete Frequency		D	
Air/Air		R	
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

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.

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.

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

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.

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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 details on airspace structure and multiple designations. More than one holding is designated on a single "fix" when one or more of the following elements are different for holdings within the same airspace structure.Inbound Holding Course, Turn Direction, Altitude, Leg Length or Leg Time, and Holding Speed.

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
All Altitude	8	See Note 1

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.

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: 1 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.

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.

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Used On: FIR/UIR, VHF NAVAID, NDB NAVAID, Enroute, Terminal Waypoint, Airport Flight Planning Continuation and Heliport records
Length: 4 characters
Character Type: Alpha
Examples: DAAG, SGAS, XX02

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
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.

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
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.

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
Length: 2 characters
Character Type: Alpha

5.119 Arc Distance (ARC DIST)

Definition/Description: The "Arc Distance" field is used 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".

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)

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 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".

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 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.

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Used On: FIR/UIR, Restrictive Airspace, and Controlled Airspace records
Length: 5 characters
Character Type: Alpha/numeric

Examples:
- All numeric: 05000, 25000
- Alpha/numeric: FL245, FL450
- All alpha: NOTSP (for Not Specified)
  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.

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
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.

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.

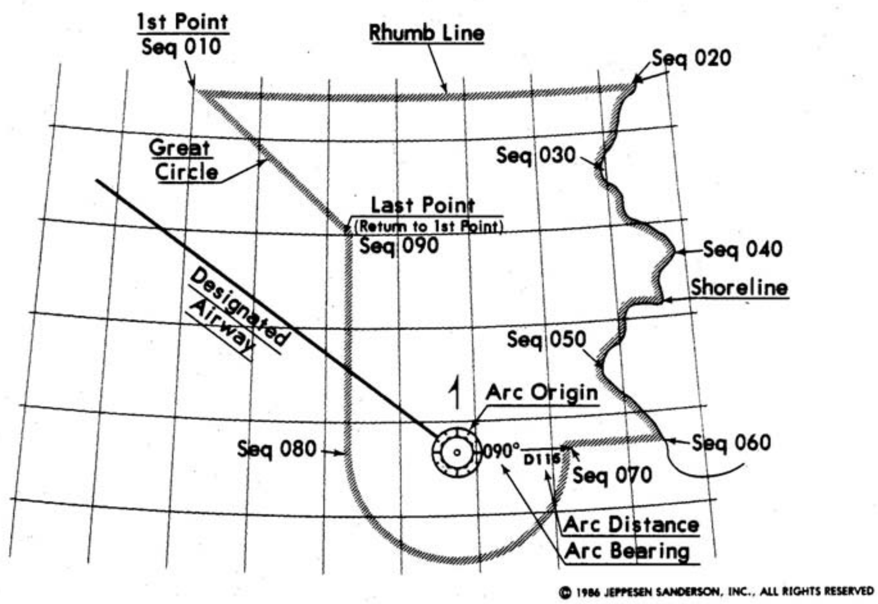
Source/Content: Maximum altitudes should be derived from official government publications describing the upper limit of the airway in feet or flight level.

Used On: Enroute Airway, Holding Pattern and Preferred Route records
Length: 5 characters
Character Type: Alpha/numeric
Examples:
- All numeric: 17999, 08000
- Alpha/numeric: FL100, FL450
- All alpha: UNLTD (for unlimited)

5.0 NAVIGATION DATA - FIELD DEFINITIONS

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

FIR/UIR AND RESTRICTIVE AIRSPACE



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

5.0 NAVIGATION DATA - FIELD DEFINITIONS

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.

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

Used On: Restrictive Airspace and Enroute Airway Flight Planning Continuation records
Length: 1 character
Character Type: Alpha

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 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
Length: 10 characters
Character Type: Alpha/numeric

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*

5.130 Multiple Code (MULTI CD)

Definition/Description: The "Multiple Code" field will be 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 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 Airspace, Airport and Heliport MSA Center, Airport and Heliport SID/STAR/Approach, and Enroute Airway Flight Planning Continuation 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 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.

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

	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

5.0 NAVIGATION DATA - FIELD DEFINITIONS

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

Length: 1 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.

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.

Used On: Controlled Airspace, Restrictive Airspace and Restrictive Airspace Continuation records
Length: 1 character
Character Type: Alpha

5.133 Unit Indicator (UNIT IND)

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)

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.

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.

Used On: Enroute Airway, FIR/UIR, Cruise Table and Flight Planning Arrival/ Departure Data Records
Length: 2 characters
Character Type: Alpha/numeric
Example:

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

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.

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.

Source/Content: Cruise Levels will be derived from official government sources. When the level is entered in feet the field will be all numeric. When the level is entered in meters, the first column will contain the alpha character "M" followed by all numeric. If the "Level To" is unlimited, the field will contain the alpha characters "UNLTD".

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)

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.

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)

Used On: Controlled Airspace, Restrictive Airspace Continuation, Referred Route Continuation, Enroute Airway Restriction, Airport and Heliport Communication Continuation and Enroute Communications Continuation Records
Length: 1 character
Character Type: Alpha

5.139 Intentionally Left Blank

5.140 Controlling Agency

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

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 Grid MORA

Definition/Description: Grid MORA Minimum Off-route Altitude (MORA) provides terrain and obstruction clearance within the section outlined by latitude and longitude blocks provided in the Starting Latitude and Starting Longitude fields.

Source/Content: Grid MORA values clear all terrain and obstructions by 1000 feet in areas where the highest elevations are 5000 feet MSL or lower. MORA values clear all terrain by 2000 feet in areas where the highest elevations are 5001 feet MSL or higher. The field will contain values expressed in hundreds of feet, for example, the value of 6000 feet is expressed as 060 and the value of 7100 feet is expressed as 071. For geographical sections that are not surveyed, the field will contain the alpha characters UNK for Unknown.

COMMENTARY

MORA values are generally not provided in government source and are calculated by the data supplier using the formula indicated in the Source/Content paragraph. There are, however, some governments that do provide off route altitude data and a data supplier may elect to use the government source values in their data services.

Used On: Grid MORA Records
Length: 3 characters
Character Type: Alpha/numeric
Examples: 010, 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.

Source/Content: When used as “MSA Center,” the field will contain the identification of the navigation facility, Enroute Waypoint, Terminal Waypoint, Runway or Airport Reference Point 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.

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

5.0 NAVIGATION DATA - FIELD DEFINITIONS

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

Figure 5-13 GRID MORA Sample

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.

5.0 NAVIGATION DATA - FIELD DEFINITIONS

5.145 Radius Limit

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.

Used On: Airport and Heliport MSA Records
Length: 2 characters
Character Type: Numeric
Examples: 25, 30

5.146 Sector Bearing (SEC BRG)

Definition/Description: When the MSA is provided as sectors of a circle, the field defines the beginning and end bearings of the sectors. The bearings are to the MSA Center Fix. When used on TAA records – The sector bearings in TAA records are the start and end bearings that define a TAA area and are to the TAA IAF Waypoint defined in that TAA identified as the straight-in or center sector record (Section 5.272). For both the MSA and the TAA record use, the bearings are entered clockwise. They enclose the sector defined in the record. The values are inclusive.

Source/Content: The Sector Bearing information will be derived from official government sources. Each sector is made up of the start of sector bearing and the end of sector bearing. The values are provided in whole degrees. The first three characters identify the start sector bearing. The second three characters identify the end sector bearing. For a MSA that is a circle, no sectors both the start and the end bearing set to 180.

Used On: Airport and Heliport MSA and TAA Primary Records
Length: 6 characters
Character Type: Numeric
Examples: 060140, a Sector that starts at 060 degrees and continues clockwise to end at 140 degrees.
140060, a Sector that starts at 140 degrees and continues clockwise to end at 060 degrees
180180, a full circle MSA Sector

5.147 Sector Altitude (SEC ALT)

Definition/Description: When used on MSA records, the "Sector Altitude" provides a 1000 foot obstacle clearance within the specified sector. When used on TAA records, the "Sector Minimum Altitude" is the minimum altitude for that sector, providing obstacle clearance compatible with the instrument procedures with which the TAA is associated, generally 1000 feet or more as necessary in mountainous areas. Flight crews are expected to fly direct to the initial approach fix in the record at the appropriate sector altitude unless otherwise instructed by ATC.

Source/Content: Sector Altitude values are derived from official government source and are provided in hundreds of feet.

Used On: Airport and Heliport MSA Records and TAA Primary Records
Length: 3 characters
Character Type: Numeric
Examples: 010 = 1000ft, 025 = 2500, 100= 10,000

5.148 Enroute Alternate Airport (EAA)

Definition/Description: The "Enroute Alternate Airport" field identifies the most suitable emergency airport along a Company Route.
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 in the database is not available for operational use, i.e., is out of service and is used to flag a VHF Navaid that is not included in a civilian international NOTAM system.

Source/Content: Actual Field Entry Values are not contained in official government source but rather are derived values based on usage, class, availability etc. These may be further adjusted by input from actual users. The content will be as defined in the table below.

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)
7	Navaid not included in a civil international NOTAM system
9	Navaid 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.

Used On :	VHF Navaid records
Length:	3 characters
Character Type:	Alpha/numeric
Examples:	030, 150, 600

5.151 FIR/UIR Address (ADDRESS)

Definition/Description: The "FIR/UIR Address" field contains the four character communications address of the FIR/UIR to supplement the FIR/UIR Ident.

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:

If the message is related to an IFR Flight -- ZQZX
If the message is related to a VFR Flight -- ZFZX

To satisfy this requirement, unless otherwise stipulated by 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

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

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.

Used On:	Restrictive Airspace, VHF NAVAID, NDB NAVAID, Enroute, Terminal Waypoint, Airport Flight Planning Continuation and Heliport records
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 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 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)

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

Used On: Airway Restriction records and Airway Restriction Continuation Records
Length: 1 character
Character Type: Alpha

5.161 Restriction Altitude (RSTR ALT)

Definition/Description: The "Restriction Altitude" fields are used to specify the altitude profile for a specific restriction.

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

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.

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 and TAA 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, MSA, and TAA 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.

Used On:	Airport, Heliport, Cruise Table and Airport and Heliport MSA Records, and Airport and Heliport TAA Record
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.

Source/Content: Channels are derived from official government sources and range from 500 to 699.

Used On:	MLS records
Length:	3 characters
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. 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
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
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.

5.0 NAVIGATION DATA - FIELD DEFINITIONS

Used On: Airport and Heliport Approach Continuation records
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)

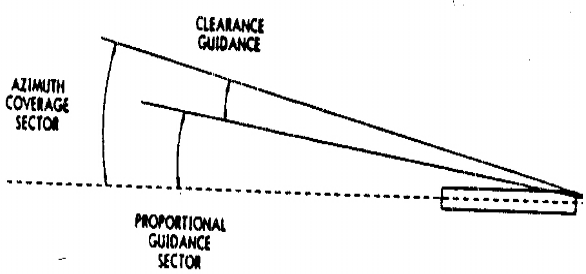
Definition/Description: The "Azimuth Coverage Sector" fields define the limit of the azimuth transmitter signal on the right and left side of the final approach course flight track. The Back Azimuth Coverage Sector is identical to the Azimuth Coverage Sector and also provides guidance for missed approaches 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.

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 Section 4.1.6.4) 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.

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 will be zeros, e.g., "080000" indicates a pad that is 80 feet in diameter.

Used On: Heliport record
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.

5.0 NAVIGATION DATA - FIELD DEFINITIONS

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 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 official 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 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 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: 5 characters max
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 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 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 Communication records
Length: 6 characters
Character Type: Alpha/numeric
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 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 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
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.

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.

Used On: Airport Communications records
Length: 2 characters
Character Type: Numeric
Examples: 05, 10, 15

5.0 NAVIGATION DATA - FIELD DEFINITIONS

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 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)

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 characters 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)

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 "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 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.

5.0 NAVIGATION DATA - FIELD DEFINITIONS

When multiple definitions are required to fully define the "Time of Operation" for a given calendar week, these are 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.

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.

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
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
D			Airport Name as Fix
F			FIR Fix
H		NOTE 1	Phonetic Letter Name Fix
I			Airport Ident as Fix
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)
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.

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.

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
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.

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

5.0 NAVIGATION DATA - FIELD DEFINITIONS

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
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 or airports that a Remote Communications Outlet (RCO) will be transmitting through.

Source/Content: Navaids or airports 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.

"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)
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 =	the individual altitude of 3000 feet and all altitudes from 7000 feet to 13000 feet (inclusive) are not available

5.204 ARC Radius (ARC RAD)

Definition/Description: The “ARC Radius” field is used to define the radius of a precision turn. In Terminal Procedures, this is the “Constant Radius To A Fix” Path and Termination, for “RF” Leg. In Holding Patterns, this is the turning radius, inbound to outbound leg, for RNP Holding. The ARC Radius field is also used to specify the turn radius of RNP holding patterns included in SID, STAR, and Approach Records as HA, HF, and HM legs.

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, Holding Pattern 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.

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.

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.

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.

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

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
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.

5.0 NAVIGATION DATA - FIELD DEFINITIONS

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.

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

5.211 Required Navigation Performance (RNP)

Definition/Description: Required Navigation 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 contents can be:

When used on Enroute Airway segments, RNP shall apply inbound to the fix when viewed in increasing sequence number order. The RNP applies only to the airway leg on which it is specified. If no RNP values is coded on a segment, there is not a database specified RNP for that segment.

When used on a SID, STAR and Approach Procedure records, the RNP shall apply to the segment on which it is coded. RNP will be coded on every segment where it is specified by source. Lack of a RNP value on a segment indicates no source supplied RNP value was available for that segment.

When used on Holding Patterns, the RNP applies to the holding pattern as defined in the record.

Note 1: The RNP concept will also be applied to defined airspaces, in addition to the specific flight paths as defined above. ARINC 424-13 addresses an "airspace record" that includes a reservation for RNP until actual content can be defined.

Note 2: There are no provisions for "Vertical RNP" in ARINC 424 at this time.

Used On: Enroute Airways, Airport and Heliport SID, STAR and Approach Route, Controlled Airspace and Holding Pattern Records
Length: 3 characters (see Content paragraph)
Character Type: Numeric (see Content paragraph)
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 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 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.

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)

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 characters
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
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	See Note 1
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	
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
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 GNSS/FMS Indicator (GNSS/FMS IND)

Definition/Description: The "GNSS/FMS Indicator" field provides an indication of whether or not the responsible government agency has authorized the overlay of a conventional, ground based approach procedure with the use of a sensor capable of processing GNSS data or if the procedure may be flown with FMS as the primary navigation equipment. The field is also used to indicate when and RNAV procedure has been authorized for GNSS-based vertical navigation.

Source/Content: The Indicator will be selected from the table below.

Indicator Definition	Field Content
Procedure Not Authorized for GNSS or FMS Overlay	0
Procedure Authorized for GNSS Overlay, primary Navaids operating and monitored	1
Procedure Authorized for GNSS Overlay, primary Navaids installed, not monitored	2
Procedure Authorized for GNSS Overlay, Procedure Title includes "GPS" or "GNSS"	3
Procedure Authorized for FMS Overlay	4
Procedure Authorized for FMS and/or GNSS Overlay	5
RNAV (GPS) or RNAV (GNSS) Procedure SBAS use authorized (Note 1)	A
RNAV (GPS) or RNAV (GNSS) Procedure use not authorized SBAS	B
RNAV (GPS) or RNAV (GNSS) Procedure, SBAS use not specified	C
Stand Alone GPS (GNSS) Procedure	P
Procedure Overlay Authorization not specified	U

WAAS was the only SBAS System approved at the time the "A", "B" and "C" codes were introduced with Supplement 17.

Note 1: Requires Procedure Data Continuation Record 4.1.9.5 for Airport and 4.2.3.5 for Heliport.

Used On: Airport and Heliport Approach Procedure Records
Length: 1 character
Character Type: Alpha/numeric

5.0 NAVIGATION DATA - FIELD DEFINITIONS

5.223 Operation Type (OPS TYPE)

Definition/Description: The “Operation Type” field contains information on the type of final approach segment.

Source/Content: A number from 00 to 15 derived from the type of approach to which the Path Point record is to be associated. A straight-in-procedure is indicated by 00. All other values are reserved for future definition.

Used On: Path Point Record
Length: 2 characters
Character Type: Numeric

5.224 Route Indicator (RTE IND)

Definition/Description: The “Route Indicator” field is a single alpha character used to differentiate between multiple final approach segments to the same runway or helipad.

Source/Content: A code of “A” through “Z,” (omitting “I” and “O”).

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 Record
Length: 1 character
Character Type: Alpha

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 an official publication value. It will be provided in meters with a resolution of one tenth. The decimal point is suppressed. When the published Height is below the Ellipsoid, the first position will carry a minus (-) sign to indicate this condition. Otherwise, this first position will be a plus (+) sign. When used on Path Point Records, the Ellipsoidal Height will be for the LTP Position defined in the Path Point Record. When used on Runway Records, the Ellipsoidal Height will be for the Landing Threshold defined in the Runway Record.

Used On: Path Point Record, Runway 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 those approach procedures that require the coding of a Path Point record. It establishes the intended descent gradient for the final approach flight path. For an illustration of the GPA and related points, see Figure 5-13.

Source/Content: The values will be derived from official government source.

Used On: Path Point Record
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°)

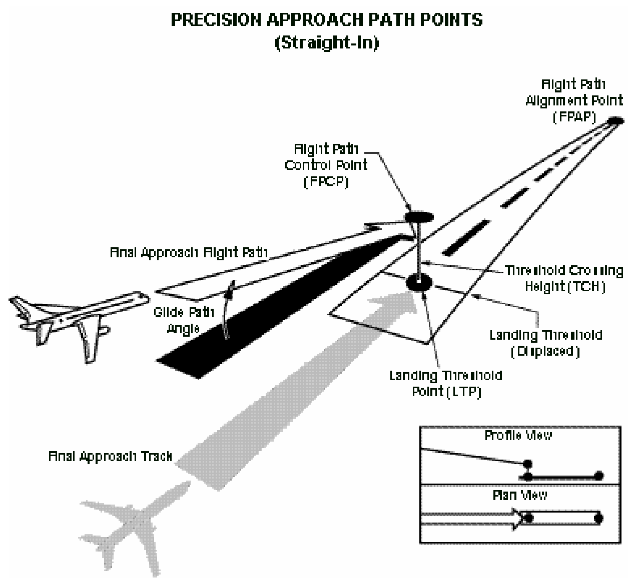


Figure 5-14 Precision Approach Path Points

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 a tenth a meter, with the decimal point suppressed. 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 Record
Length: 6 characters
Character Type: Alpha/numeric
Examples: +00356, +00051, +01566, -00022, -01566

5.228 Course Width At Threshold (CRS WDTH)

Definition/Description: The “Course Width At Threshold” field defines the width of the lateral course at the Landing Threshold Point (LTP). This width, in conjunction with the location of the Flight Path Alignment Point (FPAP) defines the sensitivity of the lateral deviations throughout the approach.

Source/Content: The width will be derived from official government sources and entered in meters in the hundreds, tens, units, tenths and hundredths format with the decimal point suppressed. The value requires a data resolution of 0.25 meters and acceptable values will end in 00, 25, 50, and 75. When the procedure is to a helicopter alighting point, the value is 38 meters.

Used On: Path Point Records
Length: 5 characters
Character Type: Numeric
Examples: 08025, 14375, 03800

5.229 Final Approach Segment Data CRC Remainder (FAS CRC)

Definition/Description: The "Final Approach Segment Data CRC Remainder" 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 Record
Length: 8 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.

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

Used On: Flight Planning Arrival/Departure Data Records
Length: 1 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 indicate the use restriction with a character from the table below.

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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: 1 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: 1 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: 1 character
Character Type: Alpha

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.

Used On: Flight Planning Arrival /Departure Data Records
Length: 1 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 characters
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: 1 character
Character Type: Numeric

5.242 Procedure Category (PROC CAT)

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 "GNSS Channel Number" field identifies the channel that will be decoded to identify the augmentation system used.

Source/Content: The Channel Number is derived from official government sources. It consists of 5 numeric characters in the range 20001 to 99999 (numbers less then 20000 are reserved for ILS and MLS). Channel Numbers between 20001 and 39999 are reserved for GBAS (and SBAS if applicable) and 40000 to 99999 are reserved for SBAS.

Used On: GLS and Path Point Continuation Records
Length: 5 character
Character Type: Numeric
Examples: 20010, 56234

5.245 Service Volume Radius

Definition/Description: 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.

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Used On: GLS Record
Length: 2 characters
Character Type Numeric
Examples: 05, 19

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

Definition/Description: 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

5.248 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: 1 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 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: 3 characters max.
Character Type: Numeric

5.0 NAVIGATION DATA - FIELD DEFINITIONS

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.

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: 1 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

5.254 Fixed Radius Transition Indicator (FIXED RAD IND)

Definition/Description: Indicates that a specific turn radius from the inbound course to the outbound course is required by the airspace controlling agency.

Source/Content: When a fix radius turn is required a 3 digit numeric value will be entered in this field representing the radius of the turn to 1 decimal place (tenths, decimal point suppressed) in nautical miles. A blank entry in this field indicates that no fixed radius transition is required.

Used On: Enroute Airway Records
Length: 3 characters
Character Type: Numeric
Examples: 225=22.5nm, 150=15.0 nm

5.255 SBAS Service Provider Identifier (SBAS ID)

Definition/Description: The "SBAS Service Provider Identifier" field is used to associate the approach procedure to a particular satellite based approach system service provider.

Source/Content: A number from 00 to 15, the exact definition of which is currently under development by ICAO SBAS SARPS working groups.

Used On: Path Point Records
Length: 2 characters
Character Type: Numeric

5.256 Reference Path Data Selector (REF PDS)

Definition/Description: The "Reference Path Data Selector" field enables the automatic tuning of a procedure by Ground Based Augmentation Systems (GBAS) avionics.

Source/Content: A number from 00 to 48, the exact definition of which is currently under development by ICAO GBAS SARPS working groups.

Used On: Path Point Records
Length: 2 characters
Character Type: Numeric

5.257 Reference Path Identifier (REF ID)

Definition/Description: The "Reference Path Identifier" field is used to provide an identifier that can be used to confirm selection of the correct approach procedure.

Source/Content: The content will be derived from official government sources and analogous to the Morse code identifier on existing ILS approach Procedures.

(Editor comment: See Section 5.243, GLS Station Identifier.)

Used On: Path Point Records
Length: 4 characters
Character Type: Alpha/numeric
Examples: GDCA, SJK2

5.258 Approach Performance Designator (APD)

Definition/Description: The "Approach Performance Designator" field is used to indicate the type or category of approach.

Source/Content: A number between 0 and 7. The content will be derived from official government source documents. The ICAO GBAS SARPS working groups will provide the complete assignment.

Used On: Path Point Records
Length: 1 character
Character Type: Alpha
Example: 1 (Category I Approach)

5.259 Length Offset (OFFSET)

Definition/Description: The "Length Offset" field is the distance from the stop end of the runway (SER) to the FPAP. This distance defines the location where lateral sensitivity changes to the missed approach sensitivity. If the FPAP is located at the designated center of the opposite runway end, the distance is zero.

Source/Content: A value, expressed in meters, derived from official government sources (Explanation and details will appear in appropriate FAA and ICAO documents). The actual resolution is 8 meters.

5.0 NAVIGATION DATA - FIELD DEFINITIONS

Used On: Path Point Records
Length: 4 characters
Character Type: Numeric
Examples: 0000, 0432

5.260 Terminal Procedure Flight Planning Leg Distance (LEG DIST)

Definition/Description: The Terminal Procedure Flight Planning Leg distance is the along track distance required to complete any given leg. It is used to determine a cumulative track distance for a given terminal procedure for flight planning purposes, from the beginning of the take-off or arrival point to the termination point of the procedure.

Source/Content: The values will be determined during route definition of the procedure records. The content is controlled through requirements of the Path and Termination and coding rules in force with the data supplier. The values are expressed in nautical miles and tenths of nautical miles, with the decimal point suppressed.

Used On: Airport and Heliport SID, STAR and Approach Procedure Flight Planning Continuation Records
Length: 4 characters
Character Type: Numeric
Examples: 0176, 0822, 0208 0016, 0100

5.261 Speed Limit Description (SLD)

Definition/Description: The "Speed Limit Description" field will designate whether the speed limit coded at a fix in a terminal procedure description is a mandatory, minimum or maximum speed.

Source/Content: The content will be as defined in the table below.

Field Entry Value	Description
@ (blank)	Mandatory Speed, Cross Fix AT speed specified in Speed Limit
+ (plus)	Minimum Speed, Cross Fix AT or ABOVE speed specified in Speed Limit
- (minus)	Maximum Speed, Cross Fix AT or BELOW speed specified in Speed Limit

Used On: Airport/Heliport SID/STAR/Approach Records
Length: 1 character
Character Type: Alpha

5.262 Approach Type Identifier (ATI)

Definition/Description: Identifies the approach types published on a given approach procedure which require path points.

Source/Content: Up to 10 characters representing the literal name of an approach with vertical guidance requiring path points, Horizontal Alert Limit (HAL) and Vertical Alert Limit (VAL). The name is derived from government source material.

Used On: Path Point Continuation Records
Length: 10 Characters
Character Type: Alpha/numeric
Examples: GLS, LPV, APV-II

5.263 HAL

Definition/Description: The Horizontal Alert Limit (HAL) is the radius of a circle in the horizontal plane (the local plane tangent to the WGS-84 ellipsoid), with its center being at the true position, which describes the region which is required to contain the indicated horizontal position with the required probability for a particular navigation mode assuming the probability of a GPS satellite integrity failure being included in the position solution is less than or equal to 10^{-4} per hour.

Source/Content: A value, expressed in meters to a resolution of tenths of meters with the decimal point suppressed, derived from official government sources.

Used On: Path Point Records
Length: 3 Characters
Character Type: Numeric
Examples: 400, 200

5.264 VAL

Definition/Description: The Vertical Alert Limit (VAL) is half the length of a segment on the vertical axis (perpendicular to the horizontal plane of WGS-84 ellipsoid), with its center being at the true position, which describes the region which is required to contain the indicated vertical position with a probability of $1\text{-}10^{-7}$ per approach, assuming the probability of a GPS satellite integrity failure being included in the position solution is less than or equal to 10^{-4} per hour.

Source/Content: A value, expressed in meters to a resolution of tenths of meters with the decimal point suppressed, derived from official government sources.

Used On: Path Point Records
Length: 3 Characters
Character Type: Numeric
Examples: 120, 500

5.265 Path Point TCH

Definition/Description: The Path Point TCH is the height above the runway threshold (LTP) or the helicopter alighting point. It is the same as the TCH defined in Section 5.67, but has greater resolution due to the required precision.

Source/Content: The value is derived from official government sources. The value may be expressed in feet to a resolution of tenths of feet, decimal point suppressed or expressed in meters to a resolution of hundredths of meters, decimal point suppressed. Whether or the value is in feet or meters can be determined from the TCH Units Indicator.

Used On: Path Point Records
Length: 6 characters
Character Type: Numeric
Examples: 566777, 356799

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5.266 TCH Units Indicator

Definition/Description: The "TCH Units Indicator" field is used in Path Point Records to define the units, Feet or Meters for the Path Point TCH. This element is included in the "CRC Wrap" a possible metric source value cannot be converted to feet.

Source/Content: The field will contain the character "F" if the Path Point TCH is provided in source documentation in feet or the character "M" if that value is provided in meters.

Used On: Path Point Records
Length: 1 character
Character Type: Alpha

5.267 High Precision Latitude (HPLAT)

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

Source/Content: The content of field is an expansion of the latitude defined in Section 5.36 to include degrees, minutes, tenths, hundredths, thousandths and tenths of thousandths of seconds to accommodate the high precision resolution of 0.0005 arc seconds.

Used On: Path Point Records
Length: 11 characters
Character Type: Alpha/numeric
Example: N3028422400

5.268 High Precision Longitude (HPLONG)

Definition/Description: The "High Precision Longitude" field contains the latitude of the navigation feature identified in the record.

Source/Content: The content of field is an expansion of the latitude defined in Section 5.36 to include degrees, minutes, tenths, hundredths, thousandths and tenths of thousandths of seconds to accommodate the high precision resolution of 0.0005 arc seconds.

Used On: Path Point Records
Length: 12 characters
Character Type: Alpha/numeric
Example: W081420301000

5.269 Helicopter Procedure Course (HPC)

Definition/Description: The "Helicopter Procedure Course" field is used on Path Point Continuation Records to define the final approach course of procedures designed to helipads and points in space.

Source/Content: The field will contain the full degree final approach course of a procedure designed to a helipad or point in space and be derived from official government source. It will be used in conjunction with the Approach Procedure Identifier and Runway/Helipad Identifier data in the Path Point Primary record to uniquely identify an approach procedure.

Used On: Path Point Continuation Records
Length: 3 Characters
Character Type: Numeric
Examples: 003, 013, 103, 310, 333

5.270 TCH Value Indicator (TCHVI)

Definition/Description: The "TCH Value Indicator" field will define which TCH value is provided in the runway record.

Source/Content: The field will contain a value from the following table:

Field Content	Description
I	TCH Provided in Runway Record is that of the ILS or MLS Glide Slope
R	TCH Provided in Runway Record is that of an RNAV procedure to the runway
V	TCH Provided in the Runway Record is that of the VGSI for the runway
D	TCH Provided in the Runway Record is the default value of 50 feet.

Used On: Runway Records
Length: 1 character
Character Type: Alpha

5.271 Procedure Turn (PROC TURN)

Definition/Description: The "TAA Procedure Turn" field is used to indicate whether or a course reversal is necessary when flying within a particular TAA Area.

Source/Content: Official government source will carry an indication when the course reversal is not necessary. Generally, that indication is "NOPT". Otherwise, the execution of a course reversal is expected. When the course reversal is not necessary, this field will carry the alpha characters NOPT. When the course reversal is necessary, the field will be blank. The indication is provided once for a given TAA Sector Identifier.

Used on: Airport or Heliport TAA Primary Record
Length: 4 characters
Character Type: Alpha

5.272 TAA Sector Identifier

Definition/Description: The "TAA Sector Identifier" contains an indication as to which sector data is contained in the record.

Source/Content: Airport and Heliport Terminal Area Altitudes (TAA) are published for each Initial Approach Fix (IAF) for RNAV and GPS Approach procedures. The field identifies for which sector the data applies. The content is derived from official government source and entered as indicated in the table below. The terminology "left" and "right" is in reference to the final approach course, i.e., left of final or right of final, regardless of the magnetic alignment of the procedure.

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Field Content	Sector Identifier Description
C	Straight-In Area or Center Sector
L	Left Base Area
T	Right Base Area

Used On: Airport and Heliport TAA Primary Records
Length: 1 character
Character Type: Alpha

5.273 TAA IAF Waypoint

Definition/Description: The "TAA IAF Waypoint" field contains the identifier of the Initial Approach Fix (IAF) associated with a given Terminal Area Altitude sector. There may be one, two or three such IAF waypoints defined for a single approach procedure. The TAA IAF Waypoint identified in the TAA Sector with the identifier of "C" (Section 5.272) is the fix to which all sector bearing information for the procedure TAA is defined. The TAA IAF Waypoint in the individual TAA Sector records is the fix from which radius distances are defined.

Source/Content: The field contains the official identifier of the waypoint for which the TAA Sector is defined. They will be derived from official government sources.

Used On: Airport and Heliport TAA Records
Length: 5 character max
Character Type: Alpha/numeric

5.274 TAA Sector Radius

Definition/Description: The "Sector Radius" field in TAA records defines the start and end distances that define a TAA area. They are referenced to the TAA IAF Waypoint defined in that record. As TAA information is used towards that waypoint, the radius information is provided towards that waypoint. They enclose the sector defined in the record. The values are inclusive.

Source/Content: The Sector Radius information will be derived from official government source. Each TAA sector is made up of the start of sector radius and the end of sector radius. The values are provided in nautical miles. The first three digits define the radius for start of the sector, the second three digits the end of the sector, when flying towards the IAF Waypoint.

Used On: Airport and Heliport TAA Primary Records
Length: 4 characters
Character Type: Numeric
Examples: 3011, a Sector that starts at 30 nautical miles to the IAF Waypoint and ends at 11 nautical miles to the IAF Waypoint.

0500, a Sector that starts at 5 nautical miles to the IAF Waypoints and ends at that IAF Waypoint

5.275 Level of Service Name (LSN)

Definition/Description: The "Level of Service Name" field identifies the official procedure level of service based on published procedure operating minimums information for Approach Procedures authorized for SBAS.

Source/Content: The field will be derived from official government. The table below shows examples of Level of Service Names for SBAS in use at the time Supplement 18 was adopted.

Level of Service Name (Note 2)
LPV (Note 1)
LNAV
LNAV/VNAV

Used On: Procedure Data Continuation Records
Length: 10 characters (Note 3)
Character Type: Alpha

Note 1: At the time Supplement 18 was adopted, the only SBAS Level of Service published for which there is a "FAS Block provided" was LPV. If governments subsequently develop equivalent or different SBAS criteria for which there is a "FAS Block Provided", the published Level of Service Name would be provided for its associated "FAS Block Required" in the Airport or Heliport Procedure Data Continuation Record (Section 4.1.9.2 or 4.2.3.2).

Note 2: The Level of Service Names of LPV, LNAV/VNAV and LNAV are derived from FAA documentation in use force at the time Supplement 18 was adopted. Other government authorities may use other terminology to describe these procedures. It is possible for LNAV/VNAV and/or LNAV to be authorized for SBAS either with or without a "FAS Block provided."

Note 3: The field is "left justified" with the first character in the first (lowest number) column and any remaining columns filled with blanks. In the case that the field is not applicable because the associated Level of Service Authorized (Section 4.1.9.5 or 4.2.3.5, and 5.276) is "N" for Not Authorized, the entire10-character Level of Service Name field should be blank.

5.276 Level of Service Authorized

Definition/Description: The "Level of Service Authorized" field defines whether the Level of Service designated in an associated field (Section 5.275) is authorized or not authorized for a procedure.

Source/Content: The Level of Service Authorized can be derived from official government sources. It is a code selected from the table below.

Description	Field Content
Designated Level of Service is authorized for the procedure	A
Designated Level of Service is not authorized for the procedure	N

Used On: Procedure Data Continuation Records
Length: 1 characters
Character Type: Alpha

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. The data will be encoded with ASCII characters.

6.2 Header Records

There will be at least one 132-character header record for each data file. The header records contain information to uniquely identify each data file. Header record fields are considered required unless specified otherwise. Header records are identified by HDR in columns 1 through 3 of the record.

6.2.1 Header Record 1

Column	Field Name	Field Length	Reference
1 thru 3	Header Ident	3	Contains "HDR"
4 thru 5	Header Number	2	Contains decimal 01 to indicate this is the first Header Record.
6 thru 20	File Name	15	Contains the file name.
21 thru 23	Version Number	3	Contains 3 decimal numbers to uniquely identify revision of this file. Initially set to 001, but will be incremented if the file is created more than once in the same cycle.
24	Production/Test Flag	1	Contains "P" if this is a production data file. Contains "T" if this is a file created for test purposes.
25 thru 28	Record Length	4	Contains the decimal number 0132, i.e., the number of characters in each data record.
29 thru 35	Record Count	7	Contains the decimal count of the number of data records in the file.
36 thru 39	Cycle Date	4	Contains Cycle Date (5.32)
40 thru 41	Blank (spacing)	2	Contains blanks.
42 thru 52	Creation Date	11	Contains the date when the file was created. Format is DD-MMM-YYYY. Where DD is the two-digit decimal day of month, MMM is a three-character month abbreviation, and YYYY is the four-digit decimal year. (Example: 12-APR-2002)
53 thru 60	Creation Time	8	Contains the UTC time when the file was created. The format is two decimal digits each for hours, minutes, and seconds, separated by colons. (Example: 13:12:02 = 1:12:02 p.m.)
61	Blank (spacing)	1	Contains blank.
62 thru 77	Data Supplier Ident	16	Contains information to identify the data supplier. Content defined by the data supplier.
78 thru 93	Target Customer Ident	16	Contains information to identify the data user/customer (for example, the customer name(s), file codes). Content defined by the data supplier and/or customer. (Optional)
94 thru 113	Database Part Number	20	Unique part number for database. (Optional - Content TBD)
114 thru 124	Reserved	11	Contains blanks.
125 thru 132	File CRC	8	File CRC: CRC Polynomial TBD. Size of data blocks to be CRCed also TDB. Note: if it is determined that multiple CRCs are required this field will become multiple fields and have to be moved to another record(s). CRC value for the ARINC data file (including data and header records). For purposes of calculating a CRC value, Header record 1, Columns 125 through 132, shall be considered to contain zeros.

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6.2.2 Header Record 2

Column	Field Name	Field Length	Reference
1 thru 3	Header Ident	3	Contains "HDR"
4 thru 5	Header Number	2	Contains decimal 02 to indicate this is the second Header Record.
6 thru 16	Effective Date	11	If the Effective Date is the date associated with the Cycle Date, this field will contain blanks. If the file is created outside of standard cycles, this field will provide the effective date. The format is the same as the Creation Date. (Optional)
17 thru 27	Expiration Date	11	If the Expiration Date is the date associated with the Cycle Date, this field will contain blanks. If the file is created outside of standard cycles, this field will provide the expiration date. The format is the same as the Creation Date. (Optional)
28	Blank (spacing)	1	Contains blank.
29 thru 58	Supplier Text Field	30	Contains information specific to data supplier, contents to be defined by data supplier (For example, extract program version) (Optional)
59 thru 88	Descriptive Text	30	Contains description of file contents, or other information agreed upon by data supplier and customer. (For example, description of file content, test file notes, etc). (Optional)
89 thru 132	Reserved	43	Contains blanks.

6.2.3 Additional Header Records

Additional Header Records may be added.

6.3 Bit Density

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.4 Coding

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.5 Parity Convention

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.6 Reel-File Relationship

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.7 Labels

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.7.1 Volume Header Label (VOL)

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.7.2 Header 1 Label (HDR 1)

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.7.3 Header 2 Label (HDR 2)

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.7.4 End-of-File Trailer Label (EOF)

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.7.5 End-of-Volume Trailer Label (EOV)

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.8 Tape Marks

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.9 Summary of Tape Data Layout

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.9.1 One File, One Reel

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.9.2 One File, Multiple Reels

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.9.3 Multiple Files, One Reel

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

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

6.0 ENCODING STANDARDS

called for when a small change in a data block can cause programs to fail, or produce erroneous results. 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)

$G(x) =$
$x^{32} + x^{31} + x^{24} + x^{22} + x^{16} + x^{14} + x^8 + x^7 + x^5 + x^3 + x + 1$

(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

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:

110000000101000001010000001101011011

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.

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.

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

Refer to RTCA/DO-229C "Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment" for Final Approach Segment (FAS) Data Block and CRC standards.

6.11.1 Data Block Structure, M(x)

This section was deleted by Supplement 17 when Section 6.11 was revised to refer to RTCA DO-229C.

6.11.2 RNAV - GPS/GLS Approach Procedure Path Point Data Field Bits

This section was deleted by Supplement 17 when Section 6.11 was revised to refer to RTCA DO-229C.

6.11.3 CRC - Generator Polynomial, G(x)

This section was deleted by Supplement 17 when Section 6.11 was revised to refer to RTCA DO-229C.

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.

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.

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

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 should 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:

A. Full Degree of Latitude

1. Positions in the northern hemisphere use the letters "N" and "E," the southern hemisphere uses 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

7.0 NAMING CONVENTIONS

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

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 uses 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 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

South Latitude/West Longitude, longitude less than 100 degrees

S5230/W07500 - W5275
S5030/W04000 - W5040
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.

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:

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

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 should 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:

1. The first character of the fix identifier should be "D."

2. Character 2 through four should simplify the Navaid course on which the waypoint lies.

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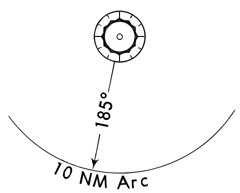
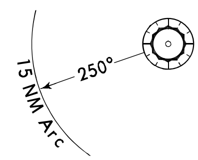
3. The last character should be the distance of the radius defining the position of the waypoint. This radius should be expressed as the equivalent letter of the alphabet, i.e., A = 1nm, G = 7nm, O = 15nm, etc.





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.

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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

Table 7-1 Multiple Approaches/Multiple Waypoints

D. Constant Radius to a Fix Waypoint

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)
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

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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

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

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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).

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

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

7.3.6 VFR Waypoints

If a VFR Waypoint is to be included in the Enroute (EA), Airport Terminal (PC) or Heliport Terminal (HC) Waypoint files for which the government authority has not provided a five-letter-name-code, one is to be created using the following conventions:

Positions 1 and 2 = use the characters VP or VC, alternatively VF or VS
Positions 3 thru 5 = numeric.
The identifiers so created are to be unique within a given ARINC Area Code.

Examples: VP001
VC101

"VP" or "VC" are the preferred position 1 and 2 codes. VF and VS are to be used after all numeric, 001 to 999, for given ARINC Area Code have been used.

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. 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 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:

   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.

7.0 NAMING CONVENTIONS

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.

7.5 Preferred Route Identifiers

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)

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

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 Navaid Waypoint FIR, ARTCC Terminal Area Geographical Entity ICAO Region	 North South East West Overfly	Three or 4-character Airport Identifier Navaid Identifier Waypoint Identifier Four Character FIR/Center ICAO Identifier Identifier of owning Airport Commonly used abbreviations Two character ICAO Region Code The character "N" The character "S" The character "E" The character "W" 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:

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.

7.0 NAMING CONVENTIONS

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

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

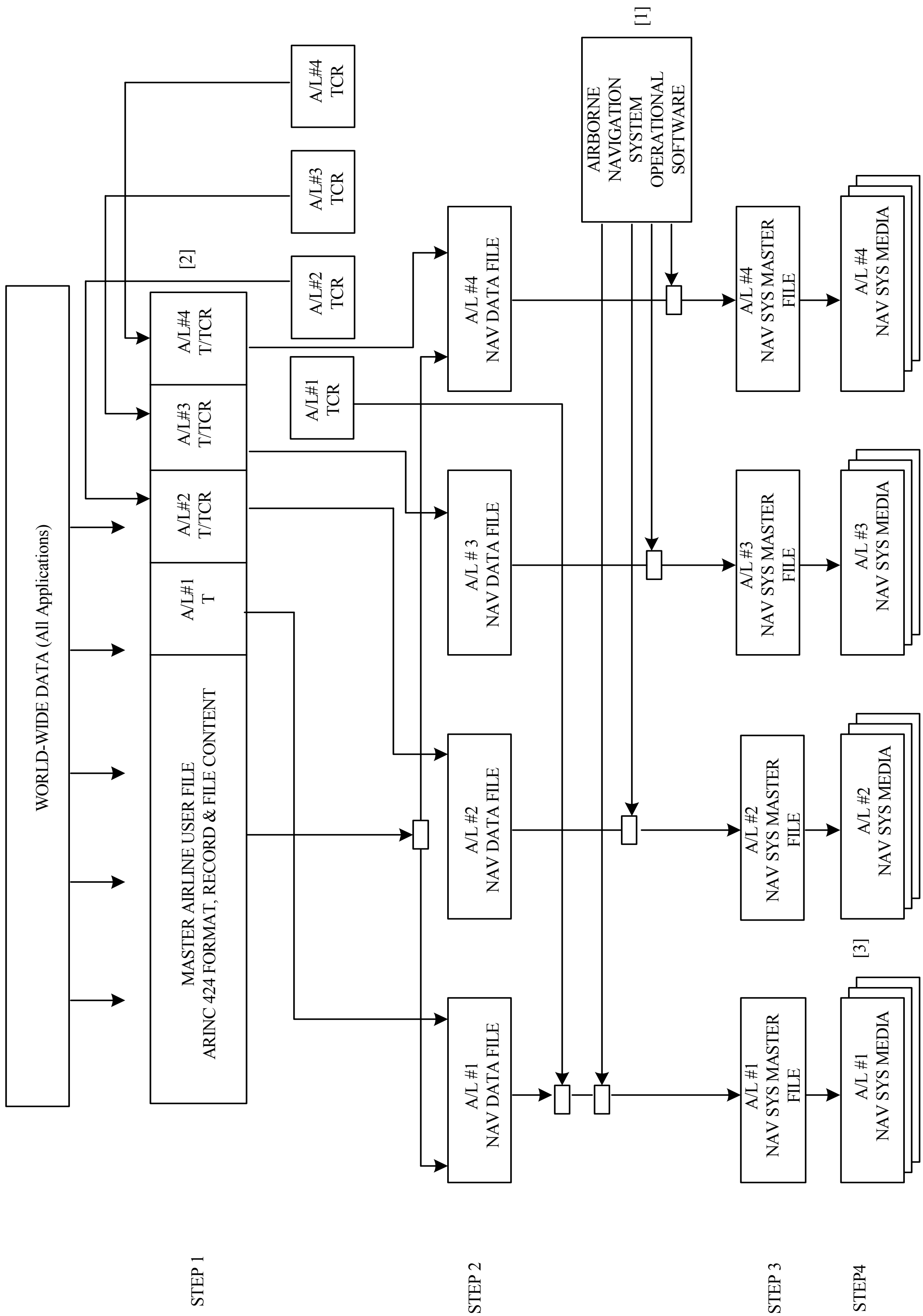
7.6 Transition Identifiers

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
FLOW DIAGRAM

Notes Concerning the Flow Diagram

1. The flow diagram shows alternate paths to individual airline master files for tailored company route (TCR) data in the individual airline boxes of step 1 level.

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.

ATTACHMENT 2
LOCAL HORIZONTAL REFERENCE DATUM NAME, DATUM CODE, AND ELLIPSOID LIST

Datum	Datum Code	Ellipsoid	Ell. Code	Location
Adindan	ADI	Clarke 1880	CD	Burkina Faso, Cameroon, Ethiopia, Mali, Senegal, Sudan
Afgooye	AFG	Krassovsky 1940	KA	Somalia
Ain El Abd 1970	AIN	International 1924	IN	Bahrain Island, Saudi Arabia
American Samoa 1962	AMA	Clarke 1866	CC	American Samoa Islands
Anna 1 Astro 1965	ANO	Australian National	AN	Cocos Islands
Antigua Island Astro 1943	AIA	Clarke 1880	CD	Antigua, Leeward Islands
Arc 1950	ARF	Clarke 1880	CD	Botswana, Burundi, Lesotho, Malawi, Swaziland, Zaire, Zambia, Zimbabwe
Arc 1960	ARS	Clarke 1880	CD	Kenya, Tanzania
Ascension Island 1958	ASC	International 1924	IN	Ascension Island
Astro Beacon “E” 1945	ATF	International 1924	IN	Iwo Jima
Astro DOS 71/4	SHB	International 1924	IN	St. Helena Island
Astro Tern Island (Frig) 1961	TRN	International 1924	IN	Tern Island
Astronomical Station 1952	ASQ	International 1924	IN	Marcus Island
Australian Geodetic 1966	AUA	Australian National	AN	Australia and Tasmania
Australian Geodetic 1984	AUG	Australian National	AN	Australia and Tasmania
Ayabelle Lighthouse	PHA	Clarke 1880	CD	Djibouti
Bellevue (IGN)	IBE	International 1924	IN	Efate and Erromango Islands
Bermuda 1957	BER	Clarke 1866	CC	Bermuda Islands
Bissau	BID	International 1924	IN	Guinea-Bissau
Bogota Observatory	BOO	International 1924	IN	Colombia
Bukit Rimpah	BUR	Bessel 1841	BR	Bangka and Belitung Islands (Indonesia)
Camp Area Astro	CAZ	International 1924	IN	Camp McMurdo Area, Antarctica
Campo Inchauspe 1969	CAI	International 1924	IN	Argentina
Canton Astro 1966	CAO	International 1924	IN	Phoenix Islands
Cape	CAP	Clarke 1880	CD	South Africa
Cape Canaveral	CAC	Clarke 1866	CC	Florida and Bahamas
Carthage	CGE	Clarke 1880	CD	Tunisia
Chatham Island Astro 1971	CHI	International 1924	IN	Chatham Island (New Zealand)

ATTACHMENT 2
LOCAL HORIZONTAL REFERENCE DATUM NAME, DATUM CODE, AND ELLIPSOID LIST

Datum	Datum Code	Ellipsoid	Ell. Code	Location
Chua Astro	CHU	International 1924	IN	Paraguay
Co-Ordinate System 1937 of Estonia	EST	Bessel 1841	BR	Estonia
Corrego Alegre	COA	International 1924	IN	Brazil
Dabola	DAL	Clarke 1880	CD	Guinea
Danish Geodetic Institute 1934 System	DAN	Danish 1876	DA	Denmark
Deception Island	DID	Clarke 1880	CD	Deception Island, Antarctica
Djakarta (Batavia)	BAT	Bessel 1841	BR	Sumatra (Indonesia)
DOS 1968	GIZ	International 1924	IN	Gizo Island (New Georgia Islands)
Easter Island 1967	EAS	International 1924	IN	Easter Island
European 1950	EUR	International 1924	IN	Austria, Belgium, Channel Islands, Cyprus, Denmark, Egypt, England, Finland, France, Federal Republic of Germany (West Germany), Gibraltar, Greece, Iran, Iraq, Ireland, Israel, Italy, Jordan, Kuwait, Lebanon, Luxembourg, Malta, Netherlands, Norway, Portugal, Sardinia, Saudi Arabia, Scotland, Shetland Islands, Sicily, Spain, Sweden, Switzerland, Syria, Tunisia
European 1979	EUS	International 1924	IN	Austria, Finland, Netherlands, Norway, Spain, Sweden, Switzerland
Fort Thomas 1955	FOT	Clarke 1880	CD	Nevis, St. Kitts, Leeward Islands
Gan 1970	GAA	International 1924	IN	Republic of Maldives
Gandajika Base	GAN	International 1924	IN	Zaire
Geodetic Datum 1949	GEO	International 1924	IN	New Zealand
Graciosa Base SW 1948	GRA	International 1924	IN	Faial, Graciosa, Pico, Sao Jorge and Terceira Islands (Azores)
Greek Geodetic Reference System 1987	GRX	GRS 80	RF	Greece
Guam 1963	GUA	Clarke 1866	CC	Guam
Gunuung Segara	GSE	Bessel 1841	BR	Kalimantan (Indonesia)
GUX 1 Astro	DOB	International 1924	IN	Guadalcanal Island

ATTACHMENT 2
LOCAL HORIZONTAL REFERENCE DATUM NAME, DATUM CODE, AND ELLIPSOID LIST

Datum	Datum Code	Ellipsoid	Ell. Code	Location
Herat North	HEN	International 1924	IN	Afghanistan
Hermannskogel	HER	Bessel 1841	BR	Yugoslavia (Prior to 1990), Slovenia, Croatia, Bosnia and Herzegovina, and Serbia
Hjorsey 1955	HJO	International 1924	IN	Iceland
Hong Kong 1963	HKD	International 1924	IN	Hong Kong
Hu-Tzu-Shan	HTN	International 1924	IN	Taiwan
Indian	IND	Everest	EA EC EF	Bangladesh India, Nepal Pakistan
Indian 1954	INF	Everest	EA	Thailand
Indian 1960	ING	Everest	EA	Vietnam
Indian 1975	INH	Everest	EA	Thailand
Indonesian 1974	IDN	Indonesian 1974	ID	Indonesia
Ireland 1965	IRL	Modified Airy	AM	Ireland
ISTS 061 Astro 1968	ISG	International 1924	IN	South Georgia Island
ISTS 073 Astro 1969	IST	International 1924	IN	Diego Garcia
Johnston Island 1961	JOH	International 1924	IN	Johnston Island
Kandawala	KAN	Everest	EA	Sri Lanka
Kerguelen Island 1949	KEG	International 1924	IN	Kerguelen Island
Kertau 1948	KEA	Everest	EE	West Malaysia, Singapore
Kusaie Astro 1951	KUS	International 1924	IN	Caroline Islands, Fed. States of Micronesia
L.C. 5 Astro 1961	LCF	Clarke 1866	CC	Cayman Brac Island
Leigon	LEH	Clarke 1880	CD	Ghana
Liberia 1964	LIB	Clarke 1880	CD	Liberia
Luzon	LUZ	Clarke 1866	CC	Philippines
M'Poraloko	MPO	Clarke 1880	CD	Gabon
Mahe 1971	MIK	Clarke 1880	CD	Mahe Island
Manchurian Principal System	MCN	Bessel 1841	BR	Manchuria
Massawa	MAS	Bessel 1841	BR	Eritrea (Ethiopia)
Merchich	MER	Clarke 1880	CD	Morocco
Midway Astro 1961	MID	International 1924	IN	Midway Islands

ATTACHMENT 2
LOCAL HORIZONTAL REFERENCE DATUM NAME, DATUM CODE, AND ELLIPSOID LIST

Datum	Datum Code	Ellipsoid	Ell. Code	Location
Minna	MIN	Clarke 1880	CD	Cameroon, Nigeria
Montjong Lowe	MOL	Bessel 1841	BR	Sulawesi (Indonesia)
Montserrat Island Astro 1958	ASM	Clarke 1880	CD	Montserrat, Leeward Islands
Nahrwan	NAH	Clarke 1880	CD	Masirah Island (Omna), United Arab Emirates, Saudi Arabia
Nanking 1960	NAN	International 1924	IN	China
Naparima, BWI	NAP	International 1924	IN	Trinidad and Tobago
North American 1927	NAS	Clarke 1866	CC	Bahamas, Canada, Canal Zone, Caribbean, Central America, Greenland, Mexico, United States
North American 1983	NAR	GRS 80	RF	Canada, Central America, Mexico, United States
North Sahara 1959	NSD	Clarke 1880	CD	Algeria
Observatorio Meteorologico 1939	FLO	International 1924	IN	Corvo and Flores Islands (Azores)
Old Egyptian 1907	OEG	Helmert 1906	HE	Egypt
Old Hawaiian	OHA	Clarke 1866	CC	Hawaiian Islands
Oman	FAH	Clarke 1880	CD	Oman
Ordnance Survey of Great Britain 1936	OGB	Airy 1830	AA	England, Isle of Man, Scotland, Shetland Islands, Wales
Palmer Astro	PAM	International 1924	IN	Antarctica
Pico de las Nieves	PLN	International 1924	IN	Canary Islands
Pitcairn Astro 1967	PIT	International 1924	IN	Pitcairn Island
Point 58	PTB	Clarke 1880	CD	Burkina Faso, Niger
Point Noire 1948	PTN	Clarke 1880	CD	Congo
Porto Santo 1936	POS	International 1924	IN	Porto Santo and Madeira Islands
Potsdam	PDM	International 1924	IN	Germany
Provisional South American 1956	PRP	International 1924	IN	Bolivia, Chile, Colombia, Ecuador, Guyana, Peru, Venezuela
Provisional South Chilean 1963 (also known as Hito XVIII 1963)	HIT	International 1924	IN	Southern Chile (near 53°S)
Puerto Rico	PUR	Clarke 1866	CC	Puerto Rico and Virgin Islands

ATTACHMENT 2
LOCAL HORIZONTAL REFERENCE DATUM NAME, DATUM CODE, AND ELLIPSOID LIST

Datum	Datum Code	Ellipsoid	Ell. Code	Location
Pulkovo 1942	PUK	Krassovsky 1940	KA	Russia
Qatar National	QAT	International 1924	IN	Qatar
Qornoq	QUO	International 1924	IN	South Greenland
Reunion	REU	International 1924	IN	Mascarene Islands
Rome 1940	MOD	International 1924	IN	Sardinia
RT90	RTS	Bessel 1841	BR	Stockholm
S-42 (Pulkovo 1942)	SPK	Krassovsky 1940	KA	Albania, Czechoslovakia (prior to 1 January 1993), Hungary, Kazakhstan, Latvia, Poland, Romania
Santo (DOS) 1965	SAE	International 1924	IN	Espirito Santo Island
Sao Braz	SAO	International 1924	IN	Sao Miguel, Santa Maria Islands (Azores)
Sapper Hill 1943	SAP	International 1924	IN	East Falkland Island
Schwarzeck	SCK	Bessel 1841	BN	Namibia
Selvagem Grande 1938	SGM	International 1924	IN	Salvage Islands
Sierra Leone 1960	SRL	Clarke 1880	CD	Sierra Leone
S-JTSK	CCD	Bessel 1841	BR	Czechoslovakia (prior to 1 January 1993)
South American 1969	SAN	South American 1969	SA	Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Baltra and Galapagos Islands, Guyana, Paraguay, Peru, Trinidad and Tobago, Venezuela
South Asia	SOA	Modified Fischer 1960	FA	Singapore
Stockholm 1938	STO	Bessel 1841	BR	Sweden
Sydney Observatory	SYO	Clarke 1858		New South Wales, Australia
Tananarive Observatory 1925	TAN	International 1924	IN	Madagascar
Timbalai 1948	TIL	Everest	EB	Brunei and East Malaysia (Sarawak and Sabah)
Tokyo	TOY	Bessel 1841	BR	Japan, Okinawa, South Korea
Trinidad Trigonometrical Survey	TRI	Clarke 1858		Trinidad
Tristan Astro 1968	TDC	International 1924	IN	Tristan da Cunha

ATTACHMENT 2
LOCAL HORIZONTAL REFERENCE DATUM NAME, DATUM CODE, AND ELLIPSOID LIST

Datum	Datum Code	Ellipsoid	Ell. Code	Location
Unknown	U			
Viti Levu 1916	MVS	Clarke 1880	CD	Viti Levu Island (Fiji Islands)
Voirol 1874	VOI	Clarke 1880	CD	Tunisia, Algeria
Voirol 1960	VOR	Clarke 1880	CD	Algeria
Wake Island Astro 1952	WAK	International 1924	IN	Wake Atoll
Wake-Eniwetok, 1960	ENW	Hough 1960	HO	Marshall Islands
World Geodetic System 1960	WGA	WGS-60	WS	Global
World Geodetic System 1966	WGB	WGS-66	WC	Global
World Geodetic System 1972	WGC	WGS-72	WD	Global
World Geodetic System 1984	WGE	WGS-84	WE	Global
Yacare	YAC	International 1924	IN	Uruguay
Zanderij	ZAN	International 1924	IN	Suriname

ATTACHMENT 2
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	Datum Code	Location
Lemuta	LEM	Samoa Islands
Manira	MAQ	Maldives
Marcus Astro 1961	MCS	Japan
Marcus Astro 1965	MAX	Japan
Masira Island Astro 1958	MAZ	Oman
Mercury	MET	Global
Modified Mercury	MOT	Global
Mozambique	MOZ	Mozambique
Nikolskoe Astro 1929	NIL	
NMA/S39 Wilkes Station	NMW	Antarctica
North Astro 1947	NOT	
Paga Hill 1939	PAH	West Irian, Papua New Guinea (Indonesia)
Pete Astro 1969	PET	Pitcairn Island
Pico de Sao Tome	PST	Sao Tome and Principe
Pico Norte	PIC	
Ponape Astro 1962	PON	Fed. States of Micronesia
Port Lockroy	POR	
Pronto Socorro	PRS	Brazil
Pulkovo 1932 System	PKO	U.S.S.R.
Reykjavik	REY	Iceland
Spitzbergen	SPZ	Svalbard
Table Hill	TAH	New Zealand
Taongi Astro 1952	TAO	Marshall Islands
Tsingtao Observatory	TSO	China

ATTACHMENT 2
LOCAL HORIZONTAL REFERENCE DATUM NAME, DATUM CODE, AND ELLIPSOID LIST

The following is a listing of ellipsoids that have been identified as being used with local horizontal datums.

Ellipsoid	**Ellipsoid Code**
Airy 1830	AA
Australian National	AN
Bessel 1841	
Ethiopia, Indonesia, Japan, and Korea	BR
Namibia	BN
Clarke 1858	
Clarke 1866	CC
Clarke 1880	CD
Danish 1876	DA
Everest	
Brunei and E. Malaysia (Sabah and Sarawak)	EB
India 1830	EA
India 1956	EC
Pakistan	EF
W. Malaysia and Singapore 1948	EE
W. Malaysia 1969	ED
Geodetic Reference System 1980	RF
Helmert 1906	HE
Hough 1960	HO
Indonesian 1974	ID
International 1924	IN
Krassovsky 1940	KA
Modified Airy	AM
Modified Fischer 1960	FA
South American 1969	SA
WGS 1960	WS
WGS 1966	WC
WGS 1972	WD
WGS 1984	WE

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

The following pages show a sample computer printout of an ARINC 424 data file. Each record 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.

The following ARINC 424 data file is for example only.

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

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	02000020002800028000030003100031000040000UNLTD	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	02000020002800028000030003100031000040000UNLTD	000428706
S	TCBB1	03002090M	0100002000290002900004000UNLTD	000438810
S	TCBB2	21000290M	02000020002800028000030003100031000040000UNLTD	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	02000020002800028000030003100031000040000UNLTD	000508810

The following ARINC 424 data file is for example only.

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

VHF NAVAID (D)
(With Simulation and Flight Planning Continuations)

```
SUSAD  ACV K2111020VDTA N40585370W124062570    N40585370W124062570E0170001910 256NASARCATA                 015638502
SUSAD  ACV K22 TB030100+040000B100040                                                                      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
```

The following ARINC 424 data file is for example only.

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

VHF NAVAID (D)
(With Simulation and Flight Planning Continuations)
(Continued)

```
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
```

NDB NAVAID (DB)
(With Simulation and Flight Planning Continuations)

```
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
```

The following ARINC 424 data file is for example only.

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

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
```

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

The following ARINC 424 data file is for example only.

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
```

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

The following ARINC 424 data file is for example only.

ENROUTE AIRWAY (ER)
(Continued)

```
SUSAER     V108     0050STS  K2D 0V    OL AA          118002900000 04500     17999                031838704
SUSAER     V108     0060SGD  K2D 0V    OL AA          114001101170 03000     17999                031848704
SUSAER     V108     0070CROITK2EA0E    OL AA          079000701140 03000     17999                031858704
SUSAER     V108     0080CCR  K2D 0V    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 0VEC  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
```

The following ARINC 424 data file is for example only.

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

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
```

The following ARINC 424 data file is for example only.

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

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
```

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

The following ARINC 424 data file is for example only.

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
```

The following ARINC 424 data file is for example only.

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

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
```

The following ARINC 424 data file is for example only.

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

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      0200200200201700Y3500Y56        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 VOL DRA N47265700W122182910E019900429Y261306          KSEAK1PA 00     SEATTLE              048158811
SUSAP KSEAK1VATI0012800 V0     A N47265700W122182910E019900429Y                        00                          048168810
SUSAP KSEAK1VCPT0012800 VOP    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
```

The following ARINC 424 data file is for example only.

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

AIRPORT (PA)
(With Flight Planning Continuations)

```
SUSAP KYKMK1AYKM     110000076Y N46340610W120323300E019301095250YKM K11800018000MUOOY NAS    YAKIMA AIR TERMINAL          054488807
SUSAP KYKMK1AYKM     2PKZSEKZSE                                                                                          054508807
```

TERMINAL WAYPOINT (PC)
(With Flight Planning Continuations)

```
SUSAP KYKMK1CC127  K11     ICF   N46290320W120123080                    E0191               T  IYKM089/D15.5             054518903
SUSAP KYKMK1CC127  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
```

The following ARINC 424 data file is for example only.

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

FIR/UIR (UF)
(Continued)

```
SUSAUFKZSEZQZXF01900CZVR        H N49000000W117000000                                    059838804
SUSAUFKZSEZQZXF02000CZVR        H N49000000W116330000                                    059848804
SUSAUFKZSEZQZXF02100CZVR        H N49000000W116300000                                    059858804
SUSAUFKZSEZQZXF02200CZVR        H N49000000W116000000                                    059868804
SUSAUFKZSEZQZXF02300CZEG        H N49000000W115300000                                    059878804
SUSAUFKZSEZQZXF02400CZEG        H N49000000W115000000                                    059888804
SUSAUFKZSEZQZXF02500CZEG        G N49000000W114400000                                    059898809
SUSAUFKZSEZQZXF02600KZLC        G N48250000W115000000                                    059908804
SUSAUFKZSEZQZXF02700KZLC        H N45200000W115000000                                    059918804
SUSAUFKZSEZQZXF02800KZLC        G N45200000W117450000                                    059928809
SUSAUFKZSEZQZXF02900KZLC        G N44510000W118270000                                    059938809
SUSAUFKZSEZQZXF03000KZLC        G N43380000W119170000                                    059948809
SUSAUFKZSEZQZXF03100KZLC        G N42400000W119000000                                    059958809
SUSAUFKZSEZQZXF03200KZLC        H N41000000W119300000                                    059968804
SUSAUFKZSEZQZXF03300KZOA        G N41000000W121150000                                    059978809
SUSAUFKZSEZQZXF03400KZOA        H N41200000W122250000                                    059988804
SUSAUFKZSEZQZXF03500KZOA        H N41200000W123000000                                    059998804
SUSAUFKZSEZQZXF03600KZOA        G N41200000W123320000                                    060008804
SUSAUFKZSEZQZXF03700KZOA        G N40231500W123320000                                    060018809
SUSAUFKZSEZQZXF03800KZOA        H N40130000W123500000                                    060028804
SUSAUFKZSEZQZXF03900KZOA        G N40130000W125200000                                    060038809
SUSAUFKZSEZQZXF04000KZOA        G N40590000W126540000                                    060048809
SUSAUFKZSEZQZXF04050KZOA        G N43180800W126404600                                    060058812
SUSAUFKZSEZQZXF04100KZOA        G N45000000W126300000                                    060068809
SUSAUFKZSEZQZXF04200KZOA        GEN45302800W126425900                                    060078812
```

The following ARINC 424 data file is for example only.

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

FIR/UIR (UF)
(Continued)

```
SUSAUFKZSEZQZXU00100  CZVR11N G N48200000W128000000          18000FL600  AA SEATTLE       060088809
SUSAUFKZSEZQZXU00200  CZVR    H N48300000W125000000                                       060098804
SUSAUFKZSEZQZXU00300  CZVR    G N48300000W124450000                                       060108809
SUSAUFKZSEZQZXU00400  CZVR    G N48132015W123314105                                       060118809
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
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SUSAUFKZSEZQZXU01200  CZVR    H N49000000W121000000                                       060198804
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SUSAUFKZSEZQZXU03000  KZLC    G N43380000W119170000                                       060378809
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SUSAUFKZSEZQZXU04000  KZOA    G N40590000W126540000                                       060478809
SUSAUFKZSEZQZXU04100  KZOA    G N43180800W126404600                                       060488812
SUSAUFKZSEZQZXU04200  KZOA    G N45000000W126300000                                       060498809
SUSAUFKZSEZQZXU04300  KZOA    GEN45302800W126425900                                       060508812
```

The following ARINC 424 data file is for example only.

ATTACHMENT 3
NAVIGATION DATA FILE RELATIONSHIPS

```
                                                    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 AND REQUIRED NAVIGATION PERFORMANCE (RNP)

Airway Minimum Altitude Coding

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.

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
AIRWAY MINIMUM ALTITUDES AND REQUIRED NAVIGATION PERFORMANCE (RNP)

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.

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.

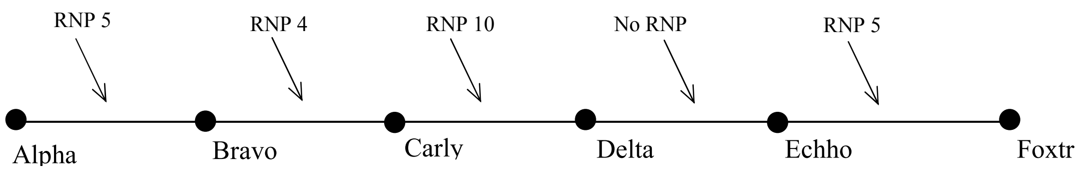
RNP Coding

RNP values are supplied inbound to the fix in the airway sequence record, when viewed in increasing sequence number order. The RNP applies only to the airway leg on which it is supplied. Like-values in subsequent sequences will be repeated in the airway record. If no RNP values is supplied on a segment, there is not a database specified RNP for that segment.

Examples of coding:

Airway Sequence Number	Airway Fix Ident	Airway Segment RNP
010	ALPHA	Blank
020	BRAVO	050
030	CARLY	040
040	DELTA	100
050	ECHHO	Blank
060	FOXTR	050

ATTACHMENT 4
AIRWAY MINIMUM ALTITUDES AND REQUIRED NAVIGATION PERFORMANCE (RNP)



Explanation:

Sequence 010 has a "blank" RNP field. In the example, sequence 010 is the first sequence of the airway and there is no "inbound to the fix" data

Sequence 020 has a coded RNP value of 050, meaning that a RNP of 5.0NM applies to the segment defined by the waypoints ALPHA and BRAVO, regardless of the direction flown.

Sequence 030 has a coded RNP value of 040, meaning that a RNP of 4.0NM applies to the segment defined by the waypoints BRAVO and CARLY, regardless of the direction flown

Sequence 040 has a coded RNP value of 100, meaning that a RNP of 10.0NM applies to the segment defined by the waypoints CARLY and DELTA, regardless of the direction flown

Sequence 050 has a "blank" RNP field, meaning there is no published RNP for the segment defined by the waypoints DELTA and ECHHO, regardless of the direction flown

Sequence 060 has a coded RNP value of 050, meaning that a RNP of 5.0NM applies to the segment defined by the waypoints ECHHO and FOXTR, regardless of the direction flown. In this example, sequence 060 is the last sequence of the airway.

ATTACHMENT 5
PATH AND TERMINATOR

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.

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.

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 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.

COMMENTARY

> The use of XA legs is required to maintain consistency with published instrument procedure instructions. It is recognized that the length of XA legs (CA, FA, or VA) is highly dependent upon the aircraft performance and the altitude situation and therefore may cause unusual path generation cases.

Unless otherwise specifically stated, all of the rules, information and guidelines in this Attachment apply equally to fixed-wing and rotor-wing terminal procedures.

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.

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:

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.

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.

1. Distance to Calculation

   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.

ATTACHMENT 5
PATH AND TERMINATOR

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 at 250 kt. ground speed.

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. Outbound Leg Length for Teardrop 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 the angle determined in accordance with Rule 6.3.6 of this attachment on approach transitions to intercept the localizer approach path.

B. Use 30 to 45 degrees on all other procedures.

C. For procedures other than approach transitions to intercept the localizer approach path, 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.

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.

ATTACHMENT 5
PATH AND TERMINATOR

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.

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, IF, VA, VD, VI, VM, VR	AF, CF, DF, FM, HA, HM[2], RF, TF, VM,
SID Route Type 2, 5, or M	CA[3], CD[3], CF[3], CI[3], CR[3], DF[3], FA, FC, FD, FM, IF[4] , VA[3], VD[3], VI[3], VM[8], VR[3] ,	AF, CF, DF, FM, HA, IF[4], TF, RF, VM
SID Enroute Transition Route Type 3, 6, S or V	FA, FC, FD, IF	AF, CF, DF, HA, RF, TF,
STAR Enroute Transition Route Type 1, 4, 7 or F	FC, FD, IF	AF, CF, DF, HM, RF, TF
STAR Route Type 2, 5, 8 or M	FC, FD, IF	AF, CF, DF, FM, IF[4], RF, TF, VM
STAR Runway Transition Route Type 3, 6, 9 or S	FC, FD, HF, IF	AF, CF, FM, HF, HM, RF, TF, VM
Approach Transition Route Type A	FC, FD, HF, IF, PI	AF, CF, CI[5], HF, HM, PI, RF, TF, VI[5]
Approach Route Types in Section 5.7	IF	CF, RF, TF[6],
Missed Approach Route Type Z	AF[7], CA, CD, CF, CI, CR[7] DF, FA, FC, FD, FM, HA, HM, RF[7], TF, VA, VD, VI, VM, VR	AF, CA, CF, DF, FM, HM, RF, 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.

6 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."

7 When "AF" or "RF" are published to begin at the published Missed Approach Point.

8 When preceded by runway coded as an IF leg for SID runway transition.

ATTACHMENT 5
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.

		N E X T L E G																						
		AF	CA	CD	CF	CI	CR	DF	FA	FC	FD	FM	HA	HF	HM	IF	PI	RF	TF	VA	VD	VI	VM	VR
C U R R E N T L E G	AF																							
	CA																							
	CD																							
	CF							&																
	CI																							
	CR																							
	DF							&																
	FA																							
	FC							&																
	FD																							
	FM																							
	HA																							
	HF																							
	HM																							
	IF								*	*	*	*	*	*	*		*							
	PI																							
	RF																							
	TF							&																
	VA																							
	VD																							
	VI																							
	VM																							
	VR																							

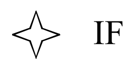
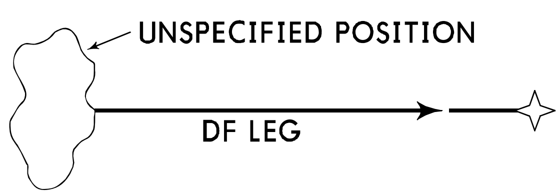
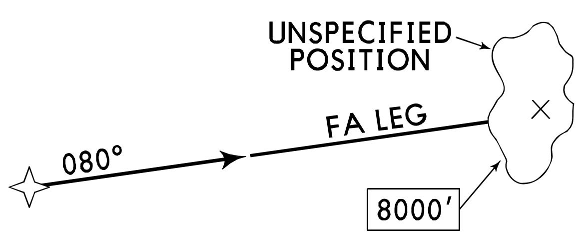
* = The IF leg is coded only when the altitude constraints at each end of the "FX," "HX" or "PI" leg are different.

& = A CF/DF, DF/DF, TF/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 Rule 3.1 in this attachment.

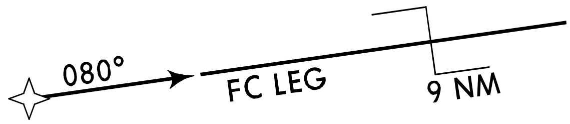
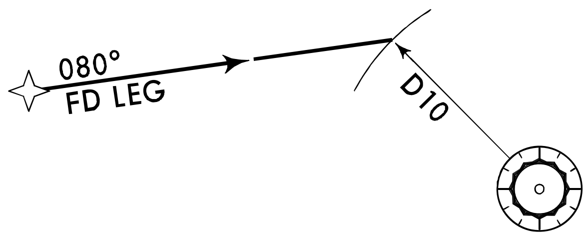
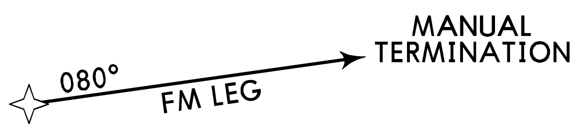
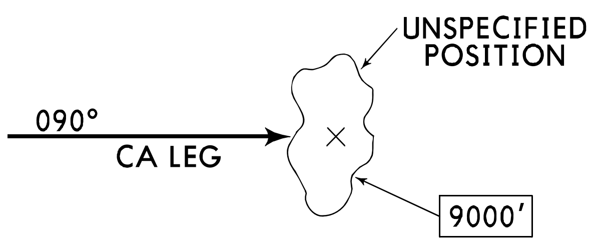
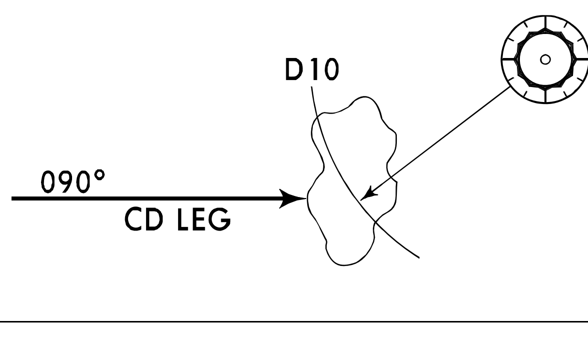
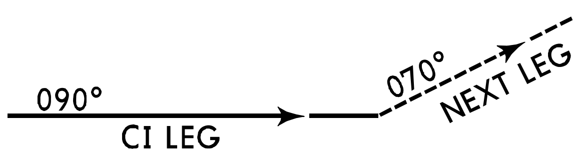
ATTACHMENT 5
PATH AND TERMINATOR

1.4 Leg Type Descriptions

The following illustrations on the various Leg Types are provided to assist coding and decoding of the Path and Terminator concept.

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.

ATTACHMENT 5
PATH AND TERMINATOR

FC		Figure 6: Track from a Fix for a Distance or FC Leg. Defines a specified track over ground from a database fix for a specific distance.
FD		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.
FM		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.
CA		Figure 9: Course to an Altitude or CA Leg. Defines a specified course to a specific altitude at an unspecified position.
CD		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.
CI		Figure 11: Course to an Intercept or CI Leg. Defines a specified course to intercept a subsequent leg.

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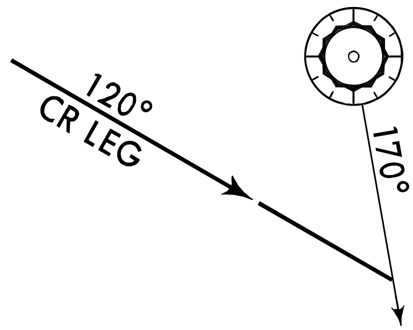
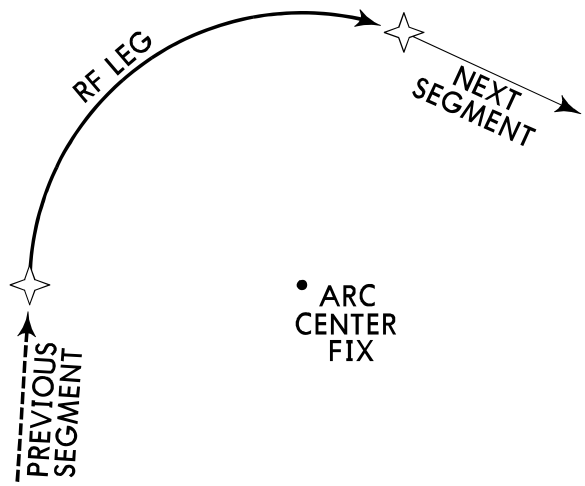
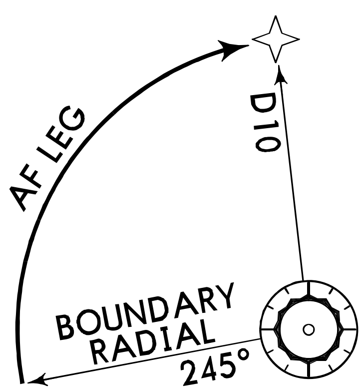
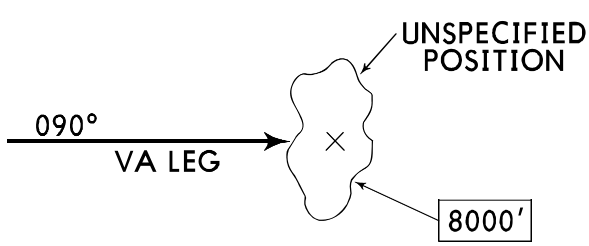
<table>
<tr><td>CR</td><td>
</td><td>Figure 12: Course to a Radial termination or CR Leg. Defines a course to a specified Radial from a specific database VOR Navaid.</td></tr>
<tr><td>RF</td><td>
</td><td>Figure 13: Constant Radius Arc or RF Leg. Defines a constant radius turn between two database fixes, 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.</td></tr>
<tr><td>AF</td><td>
</td><td>Figure 14: Arc to a Fix or AF Leg. Defines a track over ground at specified constant distance from a database DME Navaid.</td></tr>
<tr><td>VA</td><td>
</td><td>Figure 15: Heading to an Altitude termination or VA Leg. Defines a specified heading to a specific Altitude termination at an unspecified position.</td></tr>
</table>

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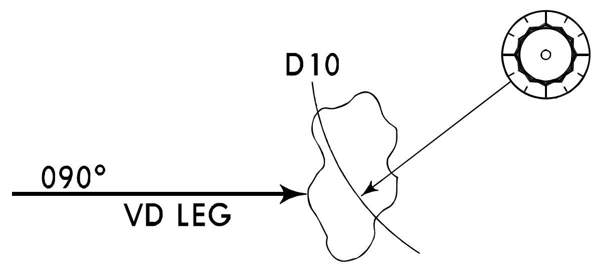
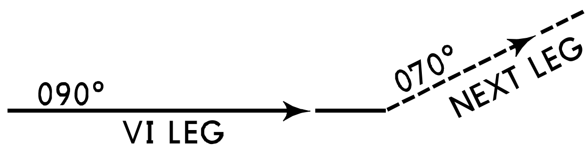
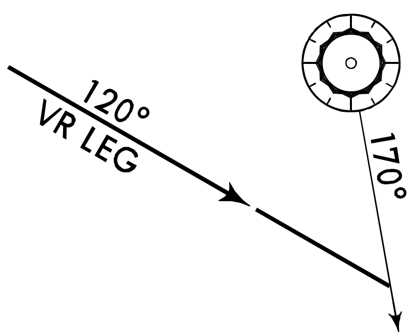
VD		Figure 16: Heading to a DME Distance termination or VD Leg. Defines a specified heading terminating at a specified DME Distance from a specific database DME Navaid.
VI		Figure 17: Heading to an Intercept or VI Leg. Defines a specified heading to intercept the subsequent leg at an unspecified position.
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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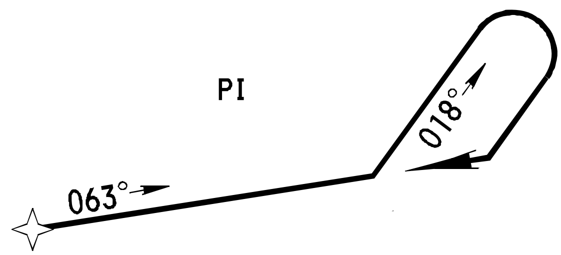
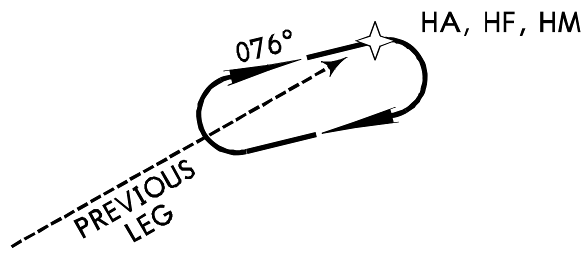
PI		Figure 20: 045/180 Procedure Turn or PI Leg. Defines a course reversal starting at a specific database fix, includes Outbound Leg followed by a left or right turn and 180 degree course reversal to intercept the next leg. A Maximum excursion Time or Distance is included as a data field.
HA, HF, HM		Figure 21: Holding in lieu of Procedure Turn (HF) for Approach Procedures and Mandatory Holds (HA, HM) in SID/STAR and Missed Approach coding. The HA, HF, and HM Leg Types define a holding pattern in lieu of procedure turn course reversal or a terminal procedure referenced mandatory holding pattern 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.

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1.5 Leg Data Fields

The following table provides 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.

Leg Data Fields Table 3

PT	W/P ID	OVR FLY	MAP	HLD	TD	TDV	RMD NAV	THETA	RHO	OBD MAG CRS	TM/ DST	ALT ONE	ALT TWO	SPD LMT	VRT ANG	ARC CTR	COMMENTS
AF	X	O		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	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	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	O			X		O	O	O	C	X	+		O			ALT TERM WILL BE "AT OR ABOVE"
HF	X	O			X		O	O	O	C	X	O		O			
HM	X	O			X		O	O	O	C	X	O		O			
IF	X			O			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	O	X		O	I		T	A	O	O	O	O	X	
TF	X	B		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	D	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
D = DME DISTANCE
+ = "AT OR ABOVE" ONLY
SHADED = NOT APPLICABLE FIELD
B = "REQUIRED" FOR CF/DF, DF/DF, TF/DF OR FC/DF COMBINATIONS, OTHERWISE "OPTIONAL"
T= Provided for the leg combinations of IF/RF, RF/RF or RF/Hx, and when the RF is the last leg of the procedure, otherwise, the outbound tangential track is contain in the next leg.
I = The inbound tangential track is provided for leg combinations IF/RF, RF/RF, or RF/HX, otherwise in the inbound tangential track is contained in the previous leg.

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2.0 Coding Rules Applicable To All Procedures

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 94 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.

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," 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.

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.

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.

2.9 Required Navigation Performance (RNP) must be applied to segment on which the value is coded. RNP will be coded on every segment where it is specified by source. Lack of a RNP value on a segment indicated that no source RNP value is available for the segment.

Examples of RNP Coding:

Standard Instrument Departure (SID)

Route Type	Trans Ident	Sequence Number	Path Terminator	Fix Ident	Segment RNP
1	RW08	010	CA		Blank
1	RW08	020	DF	ALPHA	Blank
1	RW26	010	CA		Blank
1	RW26	020	DF	ALPHA	Blank
2	Blank	010	IF	ALPHA	Blank
2	Blank	020	TF	CARLY	010
3	BRAVO	010	IF	CARLY	Blank
3	BRAVO	020	TF	BRAVO	010
3	DELTA	010	IF	CARLY	Blank
3	DELTA	020	TF	INTER	010
3	DELTA	030	TF	DELTA	050
3	ECHHO	010	IF	CARLY	Blank
3	ECHHO	020	TF	ECHHO	040

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Explanation:

There is no defined RNP for the Runway Transitions. The common segment has a RNP of 010 or 1.0NM from ALPHA to CARLY. The Enroute Transition from CARLY to BRAVO is RNP 010 or 1.0NM. The Enroute Transition to DELTA is RNP 010 or 1.0NM from CARLY to INTER and 050 or 5.0NM from INTER to DELTA. The Enroute Transition from CARLY to ECHHO is RNP 040 or 4.0NM. The "initial fix" segments carry no RNP values.

Instrument Approach Procedure

Route Type	Trans Ident	Sequence Number	Path Terminator	Fix Ident	Segment RNP
A	EAST	010	IF	EAST	Blank
A	EAST	020	TF	ALPHA	Blank
A	WEST	010	IF	WEST	Blank
A	WEST	020	TF	ALPHA	010
R	Blank	010	IF	ALPHA	Blank
R	Blank	020	TF	BRAVO (FAF)	031
R	Blank	030	TF	RW18 (MAP)	031
Z	Blank	040	DF	CARLY	010
Z	Blank	050	TF	DELTA	010
Z	Blank	060	TF	ECHHO	010
Z	Blank	070	HF	ECHHO	010

Explanation:

There is no defined RNP for the EAST transition. The WEST transition has a RNP of 010 or 1.0NM from WEST to ALPHA. The Final Approach Segment from ALPHA to Runway 18 (RW18) has a RNP of 031 or 0.3 NM. The Missed Approach Segment from the runway through the holding pattern at ECHHO has a RNP of 010 or 1.0 NM.

3.0 Path and Termination Related Rules Valid For All Procedure Types

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.

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:

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.

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.

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3.5 When an AF, CF, DF, RF, 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, RF, VD and VR “overfly” the terminator point. If “turn anticipation” is required to reflect the source, alternate leg types must be used.

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.

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.

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.

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.

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 -

- 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.

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 except when the leg combination is IF/RF, RF/RF or HX.

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.

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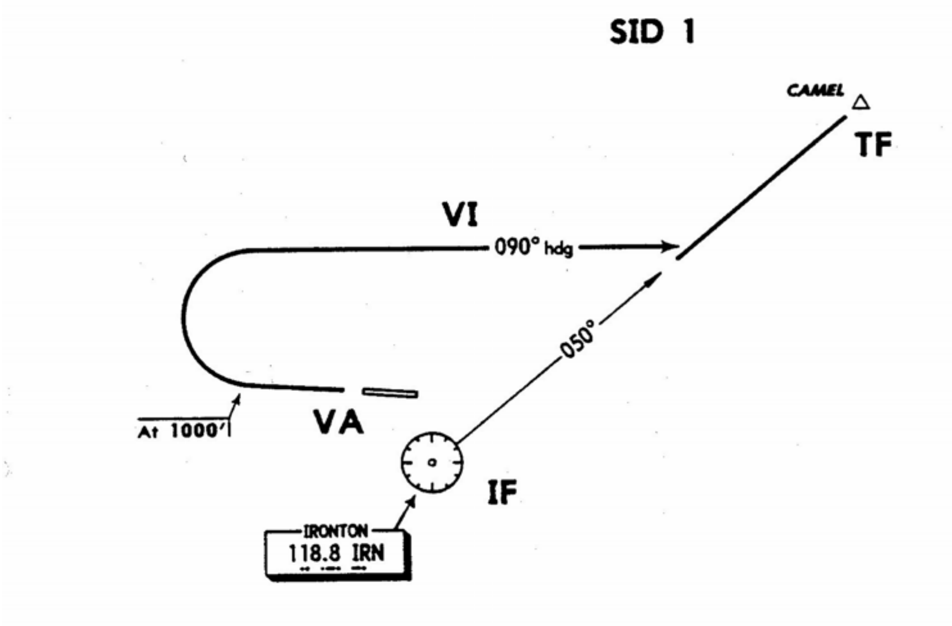
Not for navigational or other operational use. For example only. Please consult current navigation charts.



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	CF

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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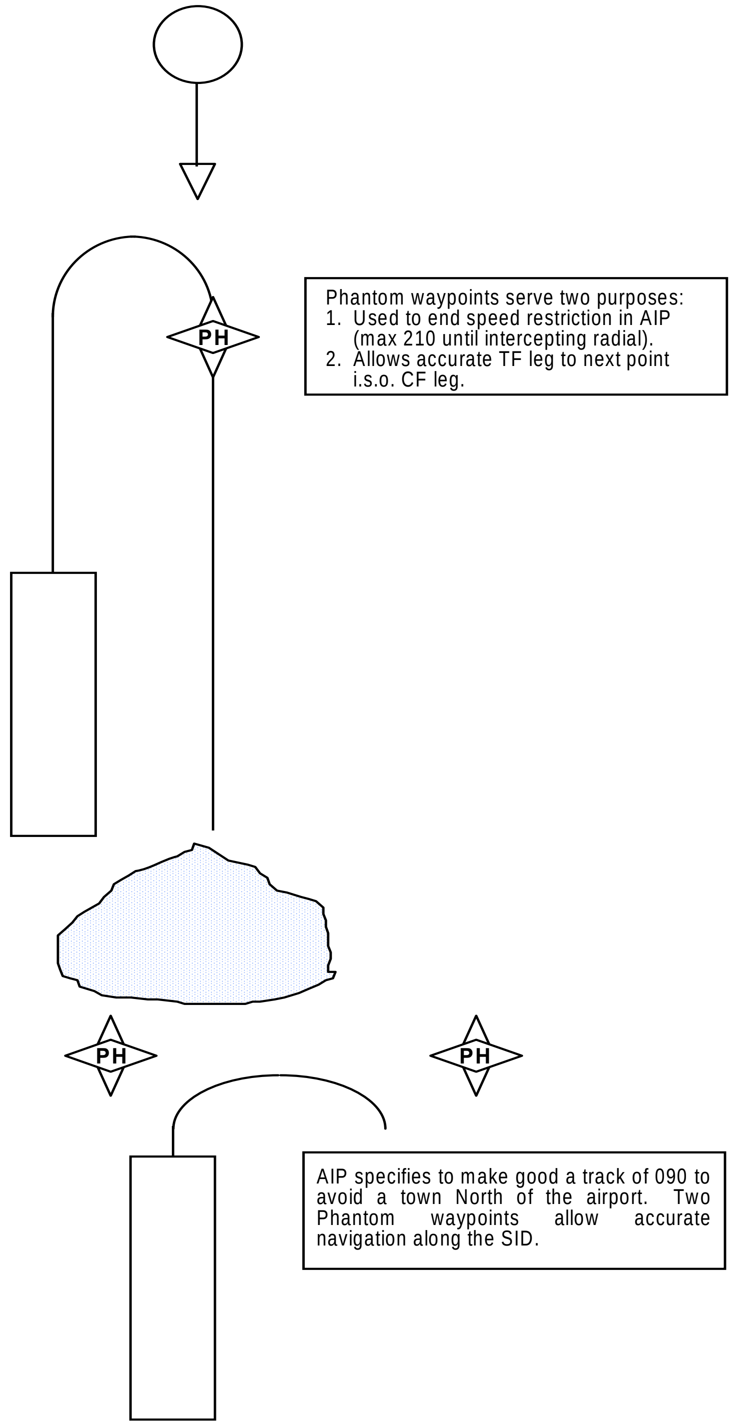

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4.0 STANDARD INSTRUMENT DEPARTURE (SID) CODING RULES

4.1 The following rules cover the altitude coding requirements of the initial leg of a departure:

If a published take-off requires a turn of greater than 15 degrees from the runway bearing, code a CA, VA or FA leg on the runway bearing/heading to an altitude of 400 feet above the airport elevation (AFE).

If a published take-off is straight ahead or requires a turn of less than 15 degrees and is to a fix such as a waypoint, Navaid, or DME distance termination, code an altitude on that fix when included in the government source, otherwise no altitude is coded.

If a published take-off is straight ahead or requires a turn of less than 15 degree and is to a specified altitude termination, code the appropriate leg type (VA, FA, CA) to that altitude.

The altitude description on a coded altitude, either a termination or at a fix, may be "at," "at or above," "at or below" and "at or below to at or above."

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 when the initial heading is defined in the source**.**

4.4 If a SID ends in vectors, the heading for the FM or VM leg must be based on source documentation.

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.

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.

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).

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."

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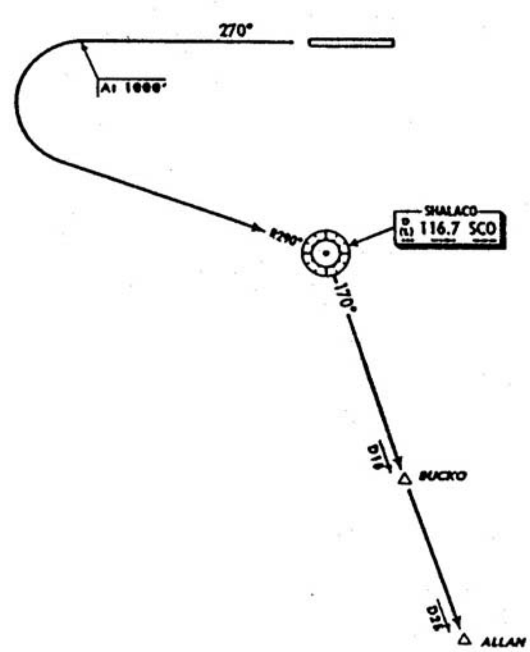
SID CODING EXAMPLE 1

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

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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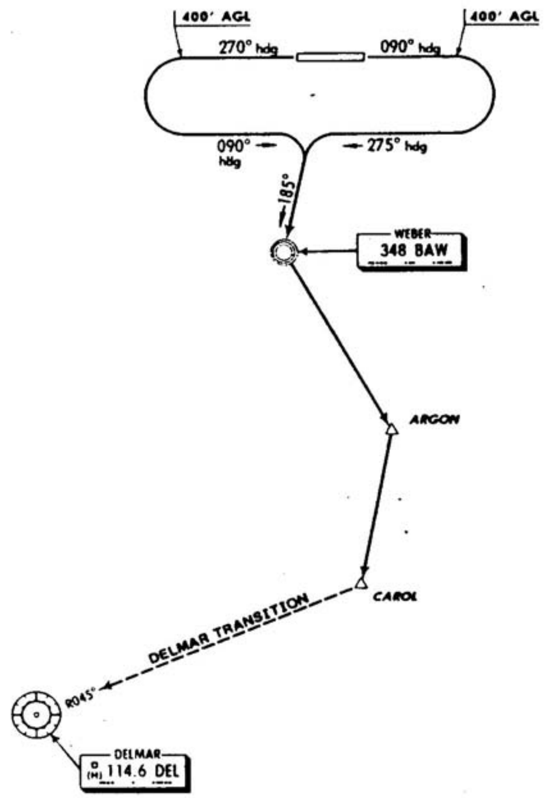
SID CODING EXAMPLE 2

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

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".

ATTACHMENT 5
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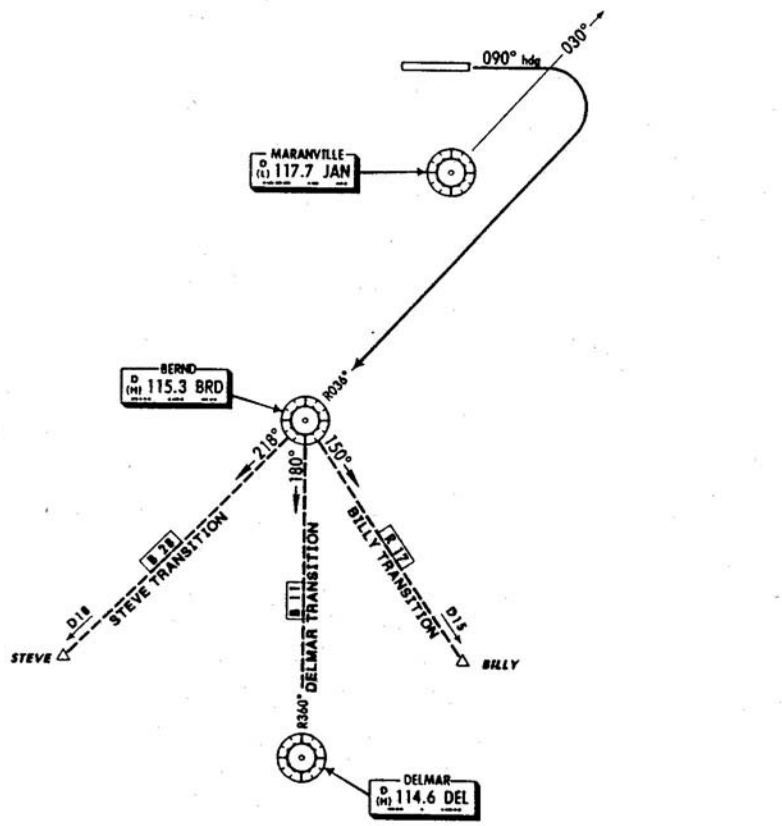
SID CODING EXAMPLE 3

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

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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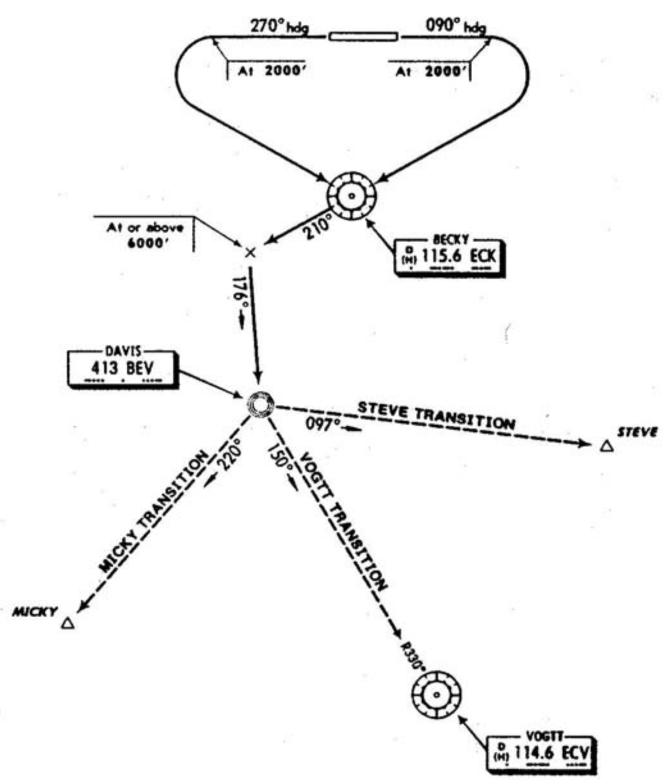
SID CODING EXAMPLE 4

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

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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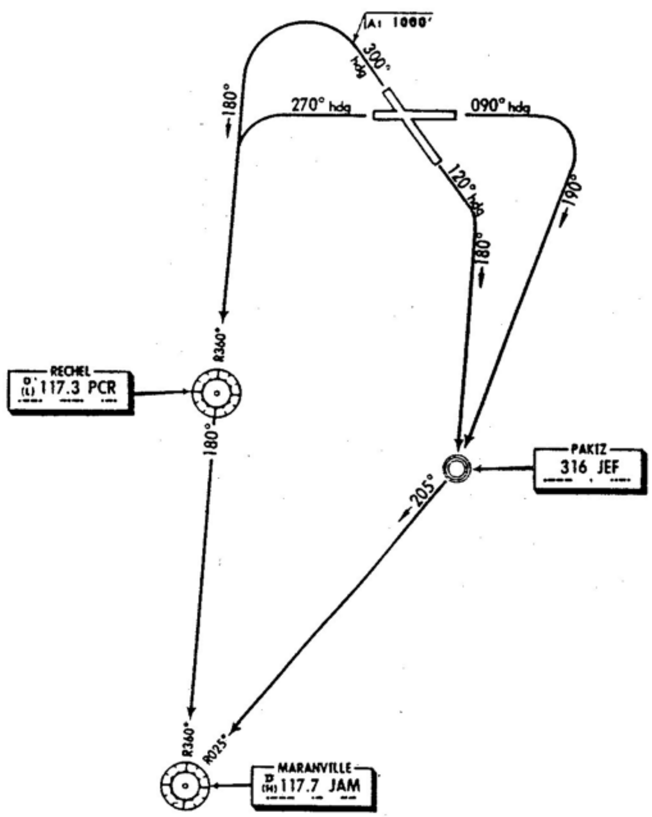
SID CODING EXAMPLE 5

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

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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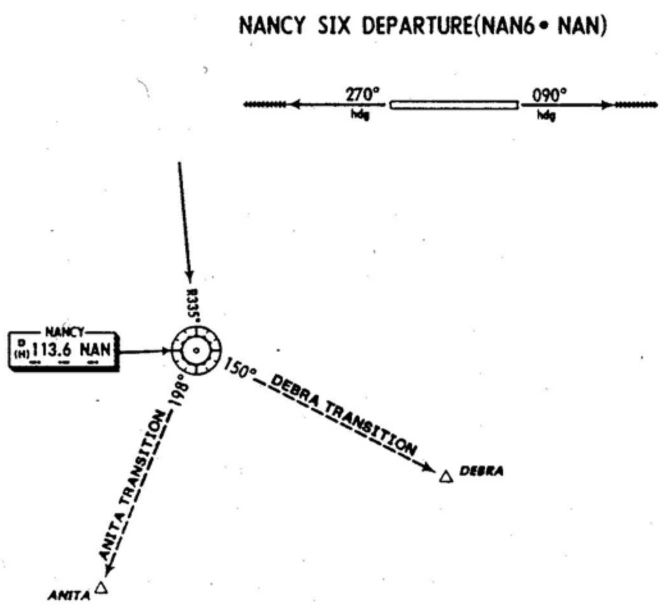
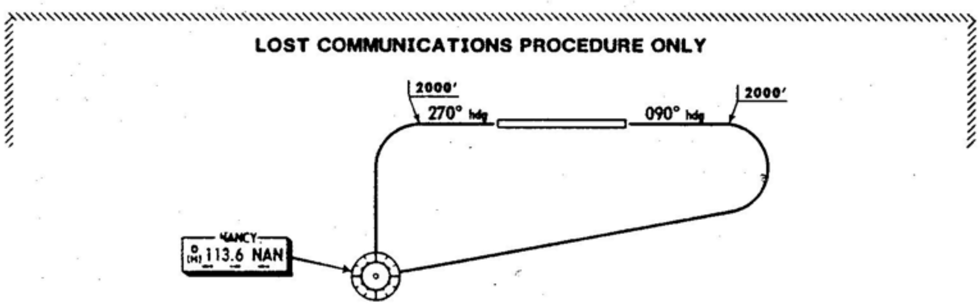
SID CODING EXAMPLE 6

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





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.

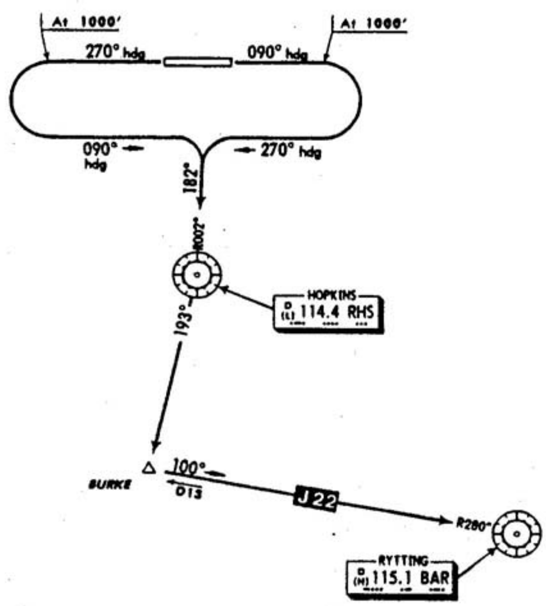
LOST COMMUNICATIONS Procedures are not coded in the ARINC 424 data base.

ATTACHMENT 5
PATH AND TERMINATOR

SID CODING EXAMPLE 7

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

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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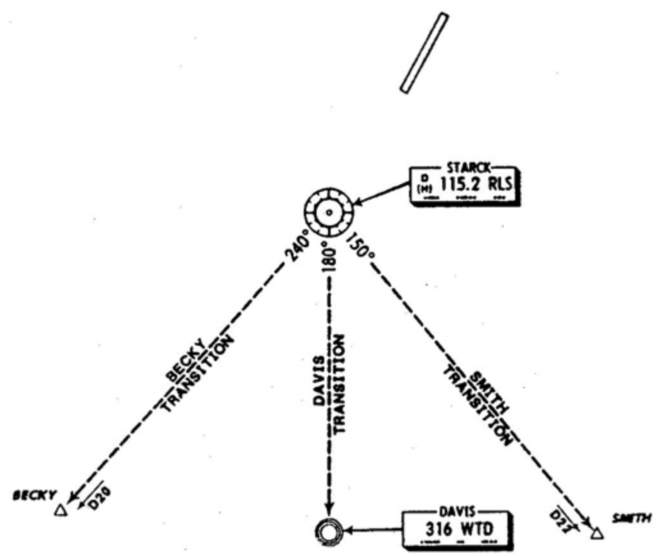
SID CODING EXAMPLE 8

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

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".

ATTACHMENT 5
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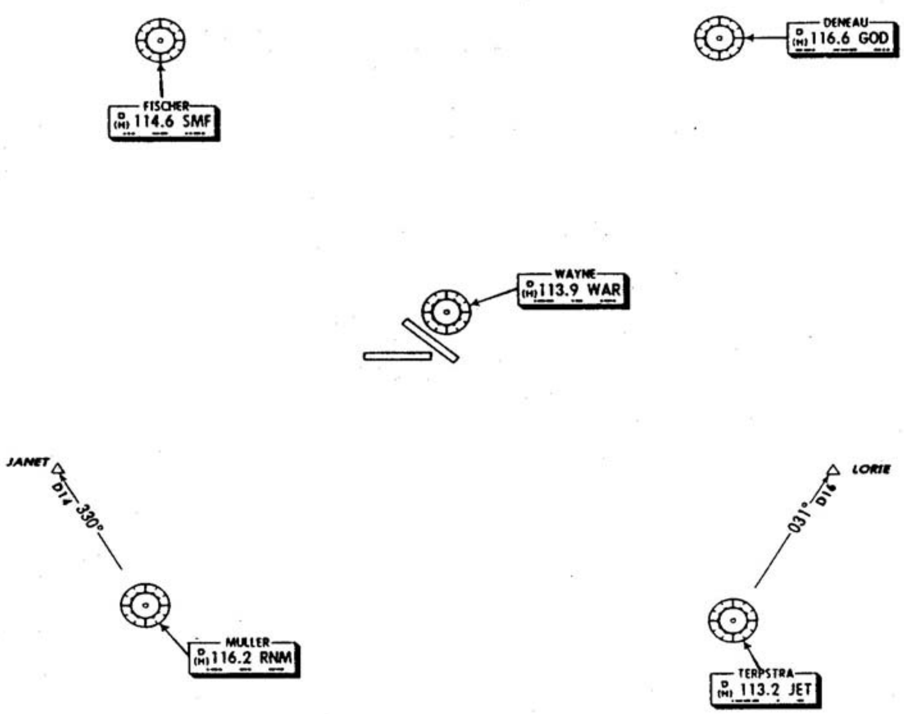
SID CODING EXAMPLE 9

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

WAYNE ONE DEPARTURE(WAR1 • WAR)(VECTOR)



VECTOR SIDs procedures are not codec in the ARINC 424 data base.

ATTACHMENT 5
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.

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.

5.7 When an Arrival Route serves the same runway or helipad as an Approach Route and the Arrival Route overlaps an Approach Transition, both the Arrival Route and the Approach Transition will be coded in their entirety in accordance with source documentation.

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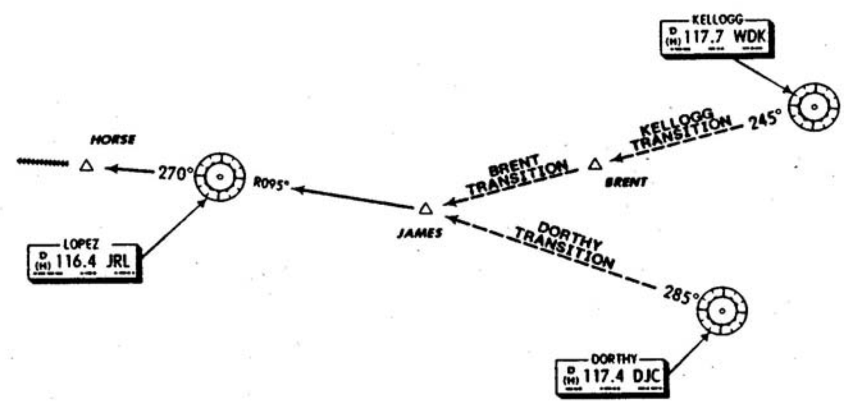
STAR CODING EXAMPLE 1

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

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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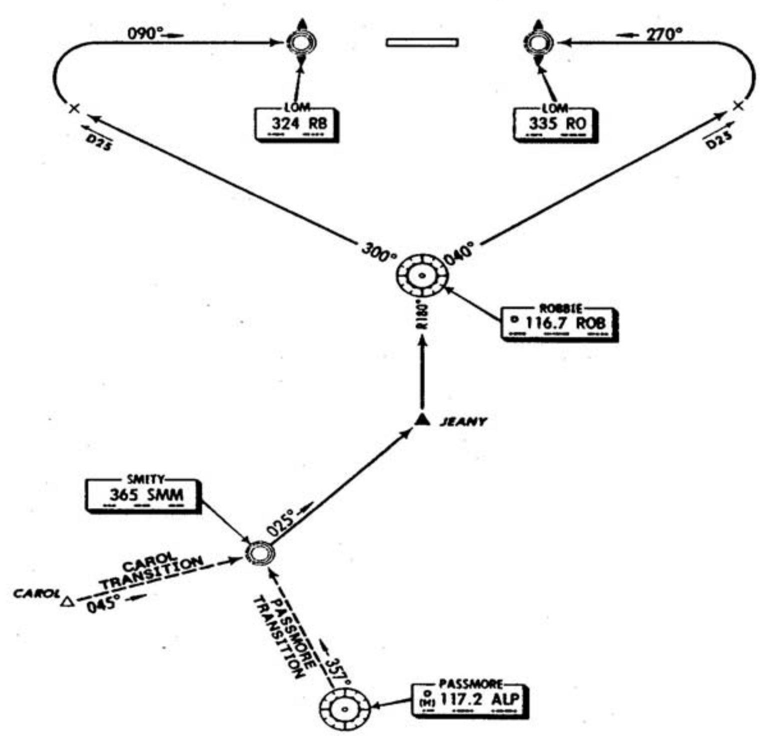
STAR CDOING EXAMPLE 2

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

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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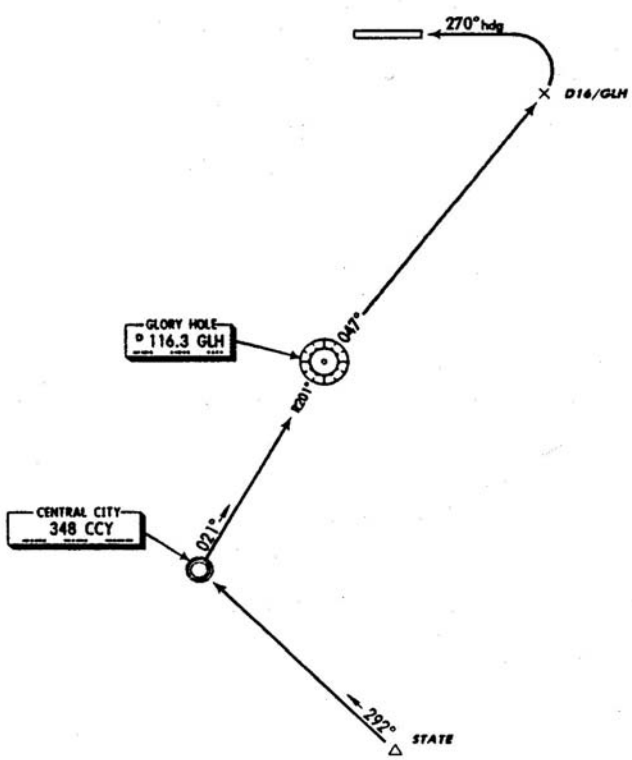
STAR CODING EXAMPLE 3

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

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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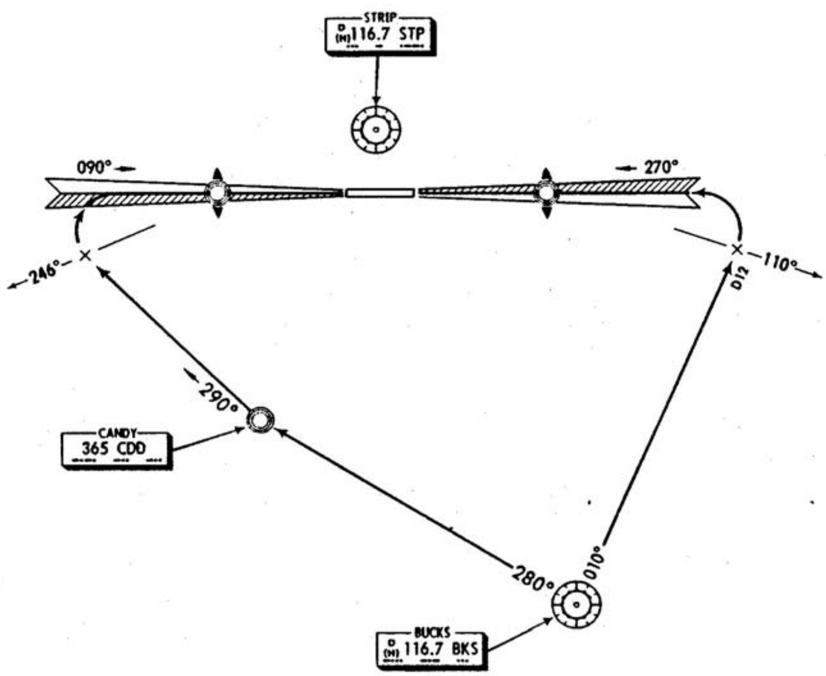
STAR CODING EXAMPLE 4

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

BUCKS SEVEN ARRIVAL (BUCKS • BUCKS7)



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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6.0 Approach Procedure Rules Valid For All Procedure Types

6.1 Multiple Approach Procedure Coding

6.1.1 Multiple Approach Procedure Definition

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.

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 Identifiers

Multiple approach procedures are identified by unique procedure identifiers and unique route types (refer to Sections 5.7 and 5.10 of this specification).

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.

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.

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.

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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 between altitudes, defined with a minimum and a maximum altitude.

These definitions include two kinds of altitudes. One is "procedural altitudes" information on mandatory or minimum altitudes at designated fixes along the final approach path. The other is the altitude related to the electronic Glide Slope or published vertical angle with recommended altitudes. The ordering of Procedural and Glide slope altitudes in the first and second altitude fields is accomplished in accordance with Section 5.29.

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. When a VORDME or VORTAC is coded as the recommended Navaid in approach procedure coding, the Navaid will be within 40 NM of the fix in which it is coded. 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.

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.

6.2.5 Approach Procedure Fix Requirements:

- All approach procedure coding requires a Final Approach Fix (FAF) and a Missed Approach Point Fix (MAP).
- The coding of Final Approach Course Fix (FACF) must be accomplished using the following rules:
    - A FACF Waypoint is required on all localizer based approaches, including, ILS, LOC, SDF, LDA, IGS and LOC Backcourse.
    - A FACF Waypoint is required on all other Approach Procedure coding:
        - At a published Intermediate Fix
        - When published by source
        - When a named fix at common ending point for transitions exists
        - When transitions end in the intercept of a track rather than to a fix.
          When the course or track inbound to the FAF is different than the course or track from the FAF to the MAP. This requirement will be met by the addition of data supplier created FACF waypoints as indicated in Rule 6.2.5.2.

6.2.5.1 Transitions may end at a FAF fix regardless of whether a FACF is coded for the procedure or not.

6.2.5.2 If no waypoint is established by source documentation for the final approach course fix and one is required by the requirements in Rule 6.2.5, one must be computed by the data supplier. For Localizer based approach procedures, the computer FACF will be on the localizer course at a distance of 2 to 8NM from the Final

Approach Fix (FAF). For all other approach types, the FACF will be computed on the published course to the FAF at a distance not less than 2NM to the FAF. See Section 2, Subsection 2.3, Special Navigation Terms. Altitude coding for this fix is defined in Rule 6.2.10.

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6.2.5.3 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 and GLS based approach procedures, establish the FAF, when none is provided by source, at the nominal outer marker position.

6.2.5.4 Except as indicated below, the published Missed Approach Point (MAP) is always coded as part of the approach procedure. This fix may be a runway threshold, helipad alighting point or a dedicated missed approach point fix waypoint. The published missed approach point may be replaced by a database supplier fix when it can be determined that the published fix is within 0.14NM of the landing threshold or helipad alighting point on the centerline or extended centerline. If the published MAP is a Navaid and is within 0.14NM of the threshold or helipad alighting point, the MAP will remain at the Navaid position. In these cases, the altitude assigned to the MAP will be a calculated altitude that is on a path that continues over the threshold at 50 feet. Such an altitude constraint must not be below the threshold/alighting point elevation.

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

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.

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 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, 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.

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.

Refer to the Examples 1 through 15 at the end of this section for a visual depiction of these rules.

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.

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6.2.10.1 Procedure Fix Altitudes, Final Approach Course Fix and Final Approach Fix.

Procedure Fix Altitudes for the Final Approach Course Fix will be coded according to official government sources and will be left blank when no altitude data is provided by the source. When coded, these altitudes will be assigned altitude descriptions codes indicating the altitude as mandatory, minimum or recommended (see Section 5.29 of this Specification). When the coded Final Approach Fix is established by the government source procedure data, the altitudes for this fix will also be coded according to official government sources. These altitudes will be assigned altitude descriptions codes indicating the altitude as mandatory, minimum or recommended (see Section 5.29 of this Specification). For government supplied altitude data, both Altitude 1 and Altitude 2 may be provided. If the Final Approach Fix is as an established fix rather than a published fix, the altitude for this fix must be computed using the procedures detailed in Sections 7 and 8 of this Attachment. For calculated altitude data, only Altitude 1 will be provided.

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.

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 the Missed Approach Point beyond the runway threshold and if a Final End Point is coded, then code an “at” altitude for the Final End Point equal to the runway threshold elevation plus the published TCH in Altitude 1 of the Final End Point Record. If TCH is not specified by source, then use 50 feet. Code an “at or above” altitude on the MAP record equal to the airport elevation plus 400 feet or a value specified by source.

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 altitude codes according to the government source documentation. These altitudes will be assigned altitude descriptions codes indicating the altitude as mandatory, minimum or recommended and altitudes on the vertical path (see Section 5.29 of this Specification). Both Altitude 1 and Altitude 2 will be used on step-down fixes.

6.2.11 Vertical angle information is in Section 7 and 8 of Attachment 5 in this document.

6.2.12 Missed Approach Point

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.

6.3 Approach Transition Route Coding Rules

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

[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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the missed approach waypoint or a step-down fix not associated with the lateral guidance of the final approach, the transition must be omitted.

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.

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 Rule Deleted by Supplement 16

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

6.3.6.1 The ending leg of all localizer-based transitions will either –

- end at the FACF (AF, CF, RF, TF, HF, HM)
- end in an intercept of the localizer inside the FACF (PI, CI or VI)
- end in a course reversal, normally at the FAF (HF, HM)

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 Navaid will be the procedure reference localizer
- if AF, HF, HM or PI, the recommended Navaid will be a VORDME or VORTAC or TACAN
- the HF, HM and PI leg may use the procedure reference localizer when a VORDME, VORTAC or TACAN is not available.

6.3.6.3 Deleted by Supplement 17.

6.3.6.4 Legs ending in an intercept will ideally be at angles of 30 degrees to the track intercepted. Angles between 10 and 90 degrees may be coded as required by source documentation, provided the resulting intercept is within the reception area of the localizer.

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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 FACF or within the reception area of the localizer as depicted in Figure A5-6-1.

Note: An FC/CF is preferred over a TF as illustrated in Figure A5-6-1 for those legs ending at a fix.

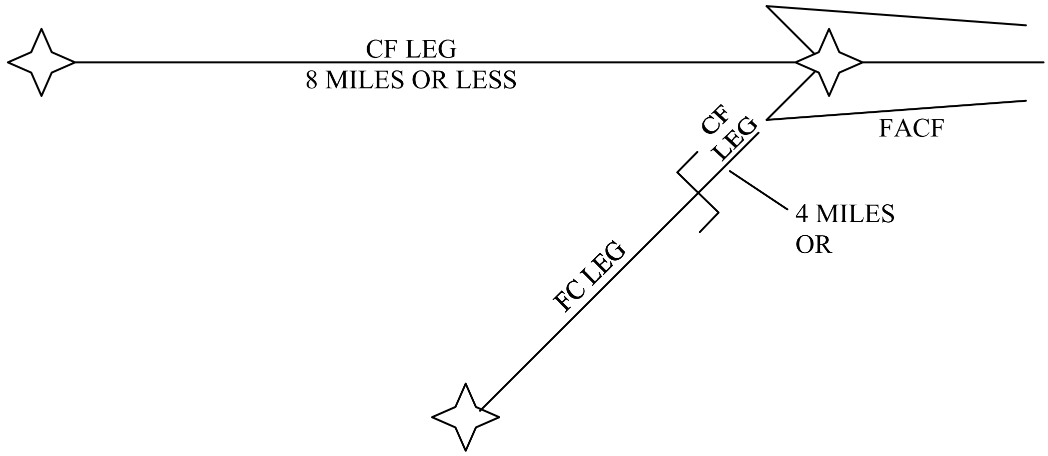

Figure A5-6-1

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 2 NM 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.

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

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.

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.

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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.

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 FACF 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 (Rule 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 (Rule 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.

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:

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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.

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 Rule 6.4.2.

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. The final approach will include a FACF when one is required by Rule 6.2.5.

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.

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.

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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 or missed approach point as the last leg in the final approach.

6.6.3.2 The recommended navaid for VORDME RNAV approaches will be the procedure 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. RF legs may be used in the final approach segment of RNAV approaches.

6.6.3.4 Final approach must include either a FAF and a runway fix or FAF and missed approach point fix.

6.7 TACAN Approach Procedure Coding

When the reference facility is TACAN (see VOR coding example 9), the following applies.

6.7.1 Final approach segments will be coded using IF and CF or TF legs only.

6.7.2 Final approach must include FACF, FAF and either a Runway Fix or Missed Approach Point Fix.

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 FAF and either a Runway Fix or Missed Approach Point Fix. The final approach will include a FACF when one is required by Rule 6.2.5.

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 NDB Approach Procedure Coding

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 Rule deleted by Supplement 17.

6.8.1.2 NDB + DME approach procedures must include a FAF and runway fix or missed approach point fix. The final approach will include a FACF when one is required by Rule 6.2.5.

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 or FACF when coded.

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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 (when coded) 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.

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

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:

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.”

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.

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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.

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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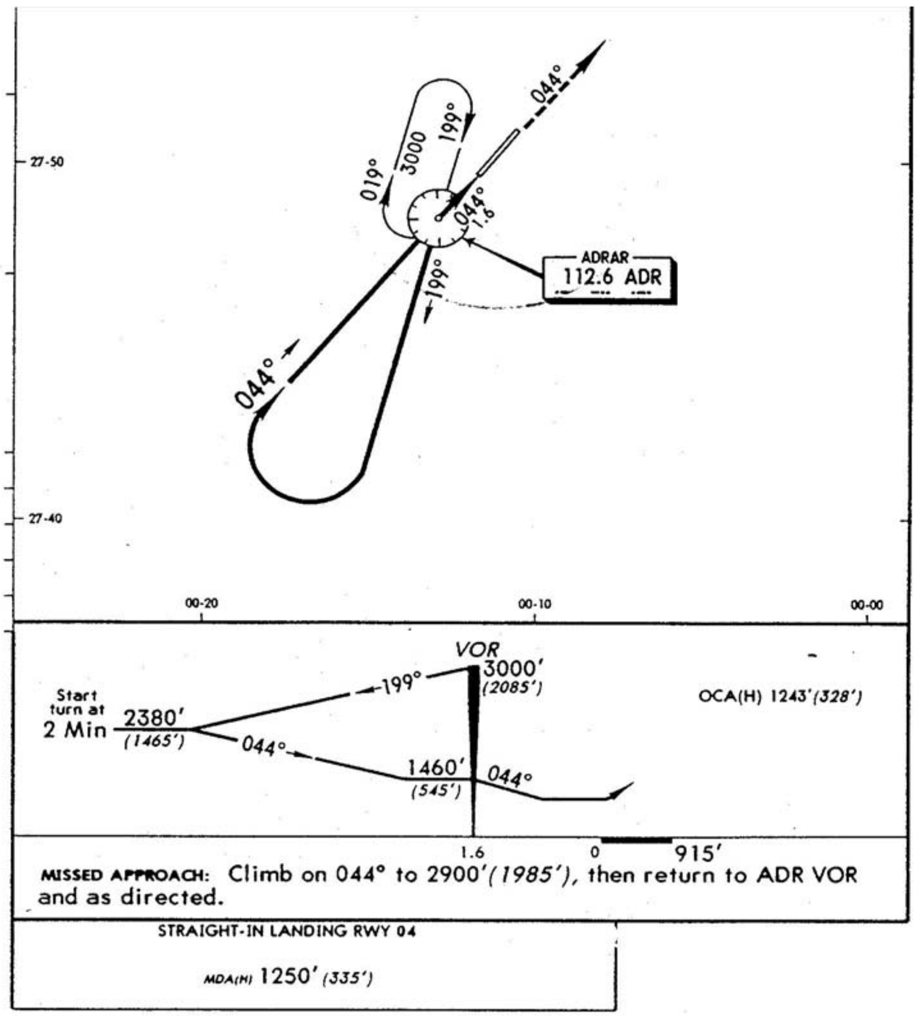
VOR CODING EXAMPLE 1

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.



APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
V04	010	CF04	IF	ADR	E__I	0034			02380	
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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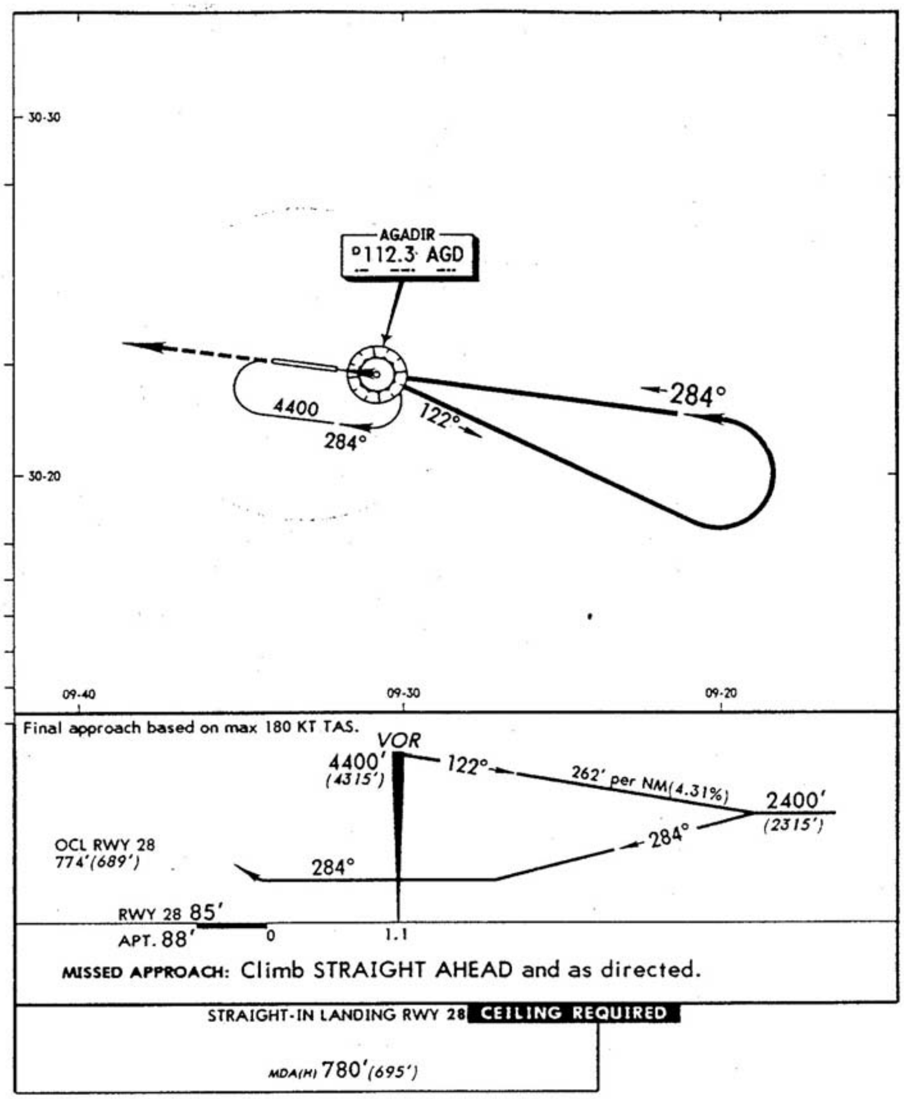
VOR CODING EXAMPLE 2

Excerpted from Jeppesen Chart Agadir, Morocco, VOR Rwy 28 Approach Chart by permission of Jeppesen Sanderson, Inc.

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
V28	010	CV28	IF	AGD	E__I	0076			02400	
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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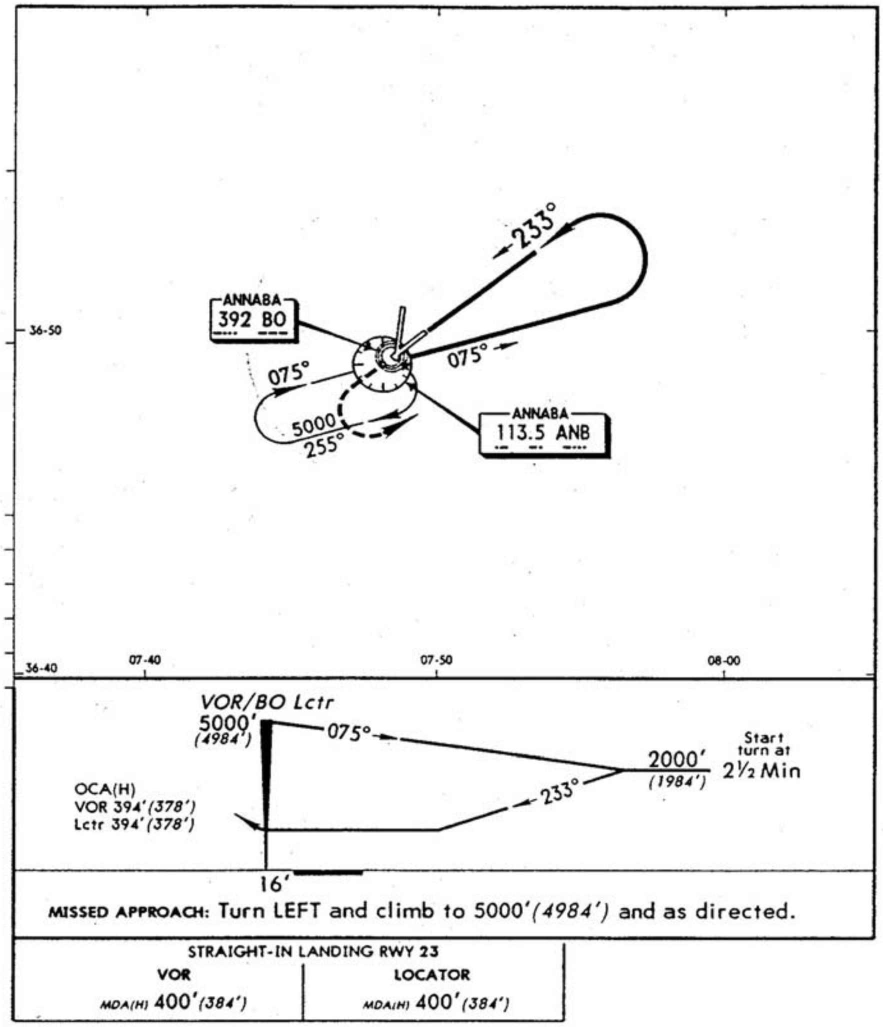

APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
V23	020	FF23	IF	ANB	E__F	0080			02000	
V23	030	RW23	CF	ANB	G___	0017	2330	0063	00066	-301
V23	040	ANB	CF	ANB	V__M	0000	2330	0017	00400	
V23	050		VM		_E__		2330		05000	

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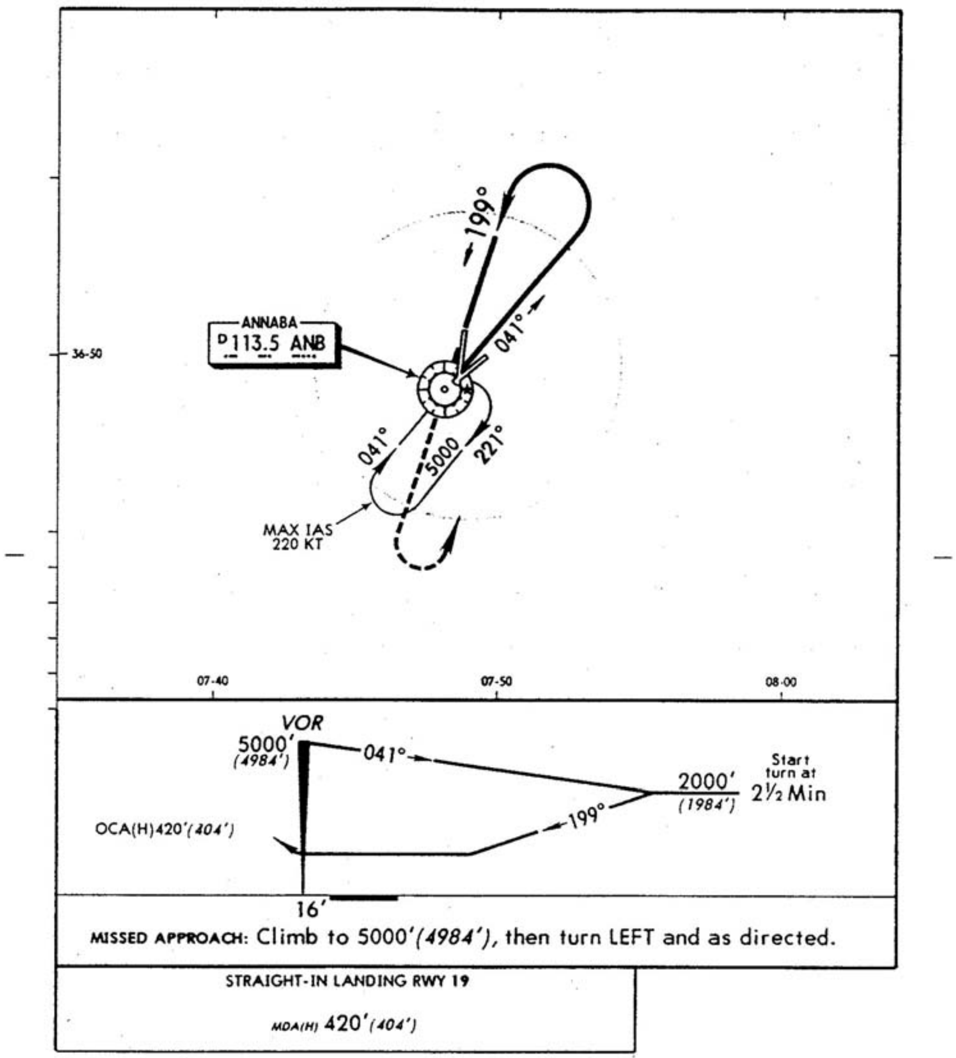
VOR CODING EXAMPLE 4

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
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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	

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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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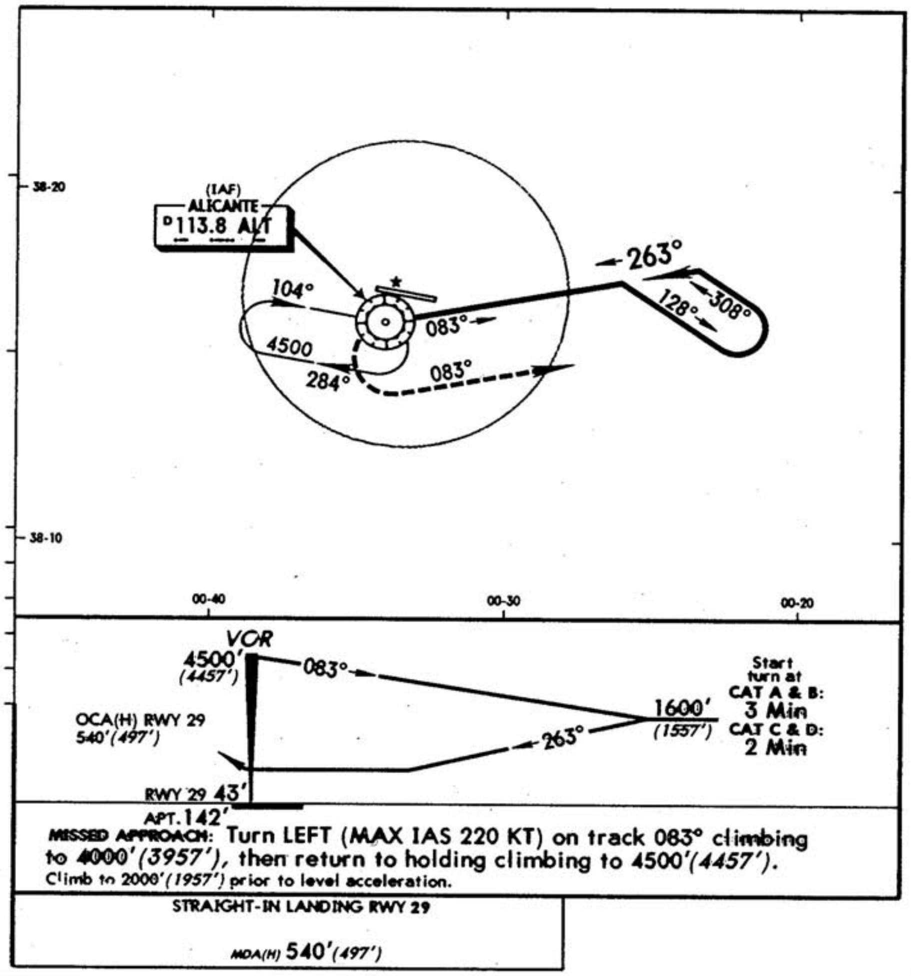

APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
V29	020	FF29	IF	ALT	E_F	0070			01600	
V29	025	RC29	CF	ALT	R_L	0026	2630	0044	00483	
V29	030	ALT	CF	ALT	V_M	0000	2630	0026	00540	000
V29	040		VA		__M_		2630		00542	
V29	050		VA				0830		04000	
V29	060	ALT	DF		V___				04500	
V29	070	ALT	HM		VE_H		1040	001T	04500	

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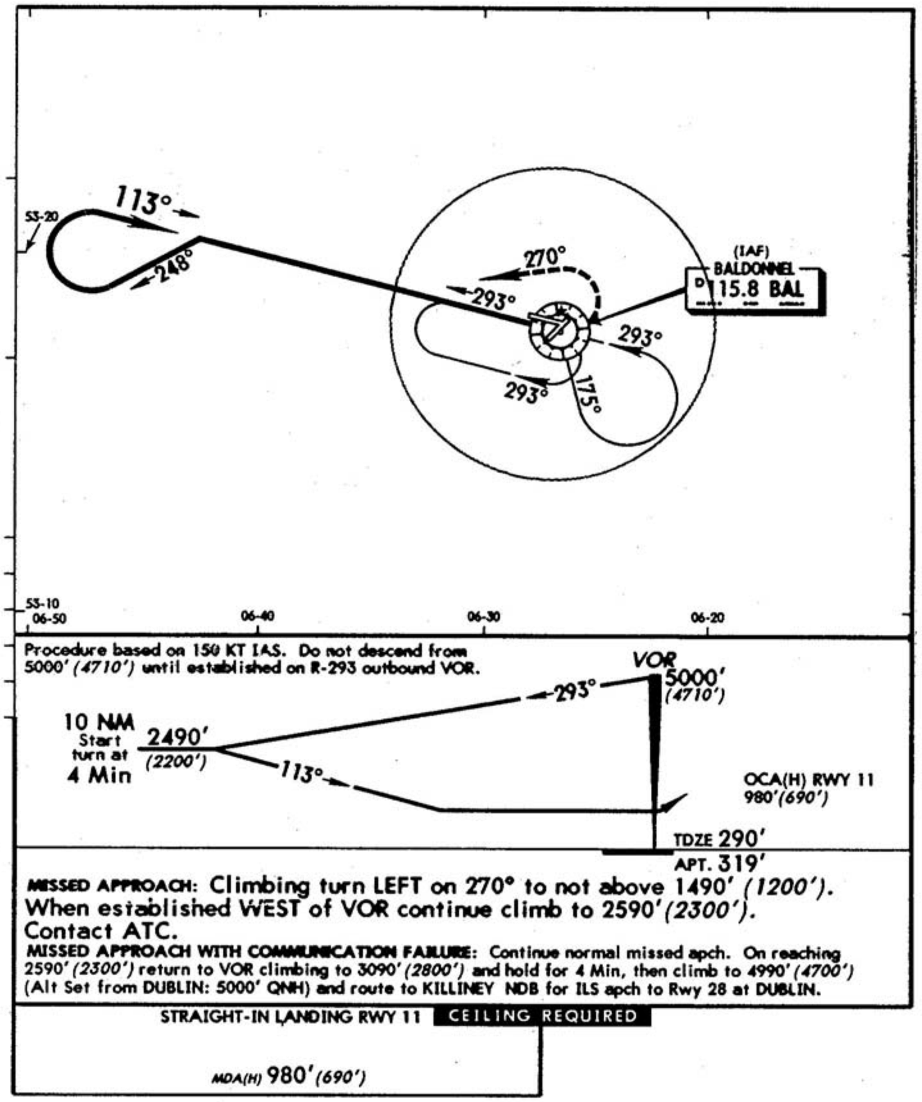
VOR CODING EXAMPLE 6

Excerpted from Jeppesen Chart Baldonnel, Ireland, VORDME 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
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	

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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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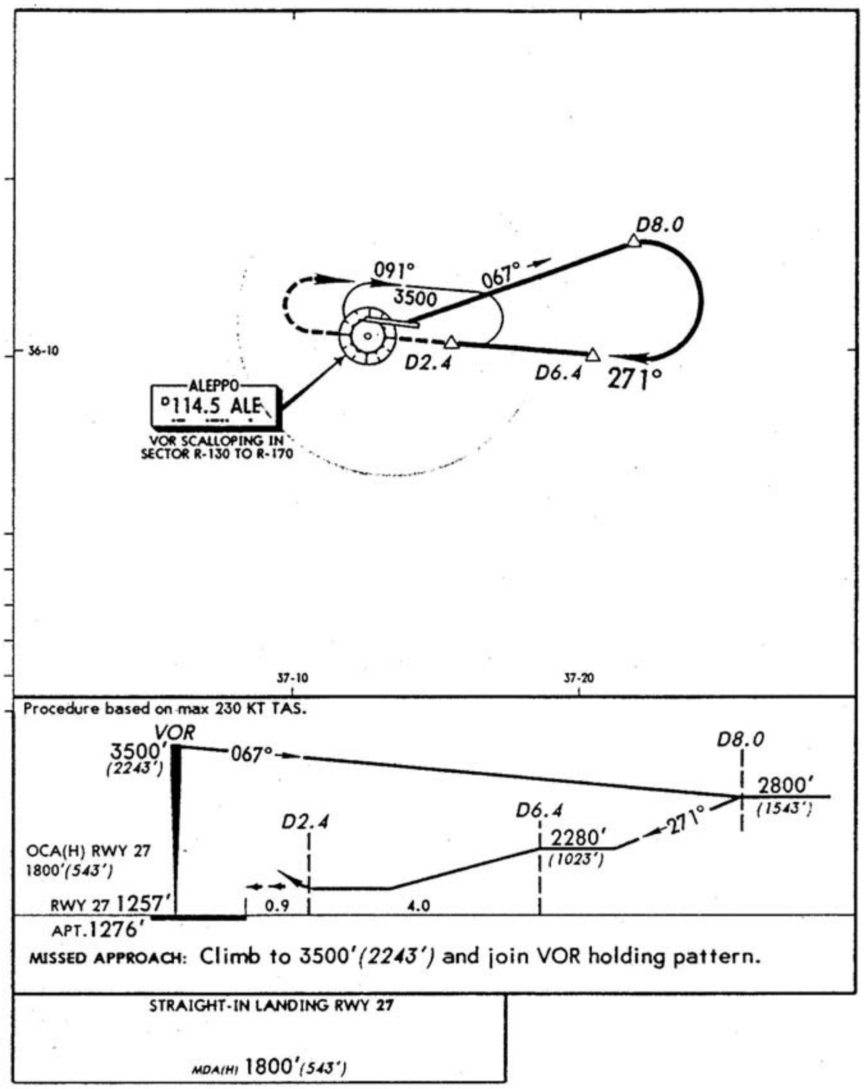

APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
V27	020	FF27	IF	ALE	E_F	0064			02280	
V27	030	MA27	CF	ALE	E_M	0024	2710	0040	01800	-300
V27	040		VA		_M_		2710		03500	
V27	050	ALE	DF	ALE	V___	0000				
V27	060	ALE	HM	ALE	VE_H	0000	2710	001T	03500	

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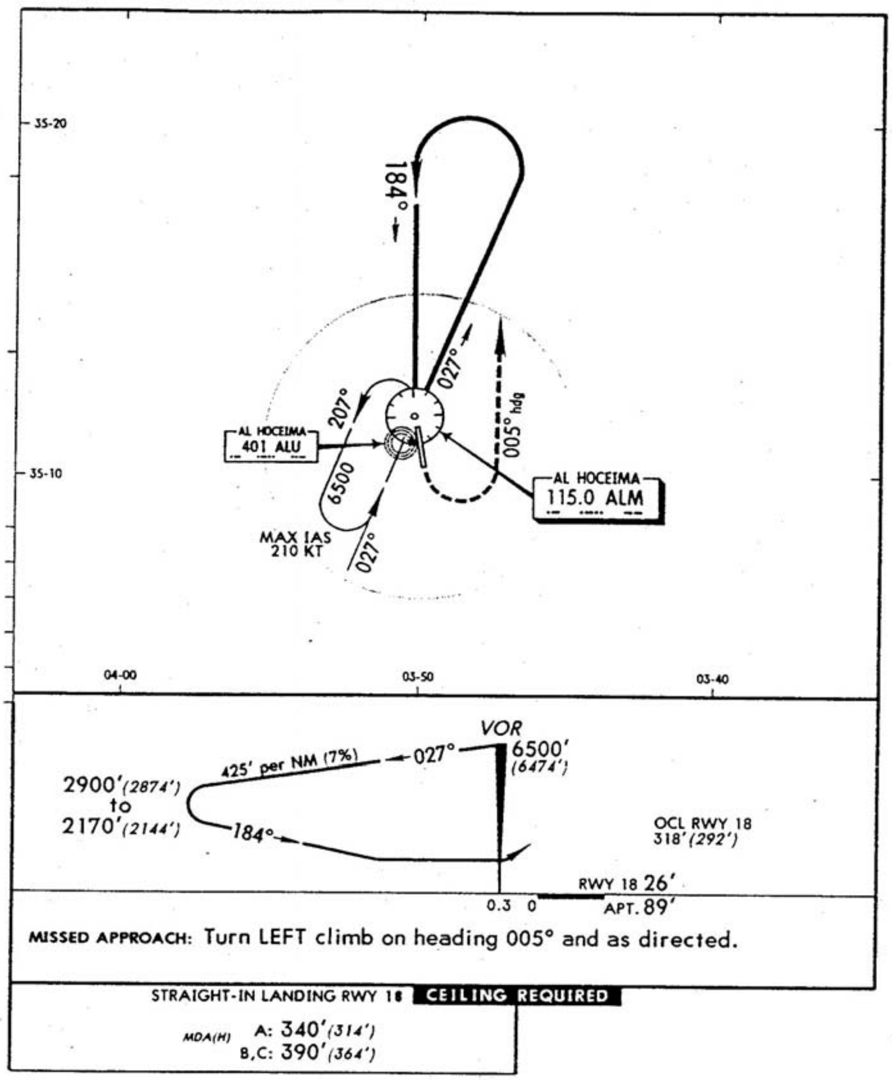
VOR CODING EXAMPLE 8

Excerpted from Jeppesen Chart Al Hoceima, Morocco, VOR Rwy 18 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
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			

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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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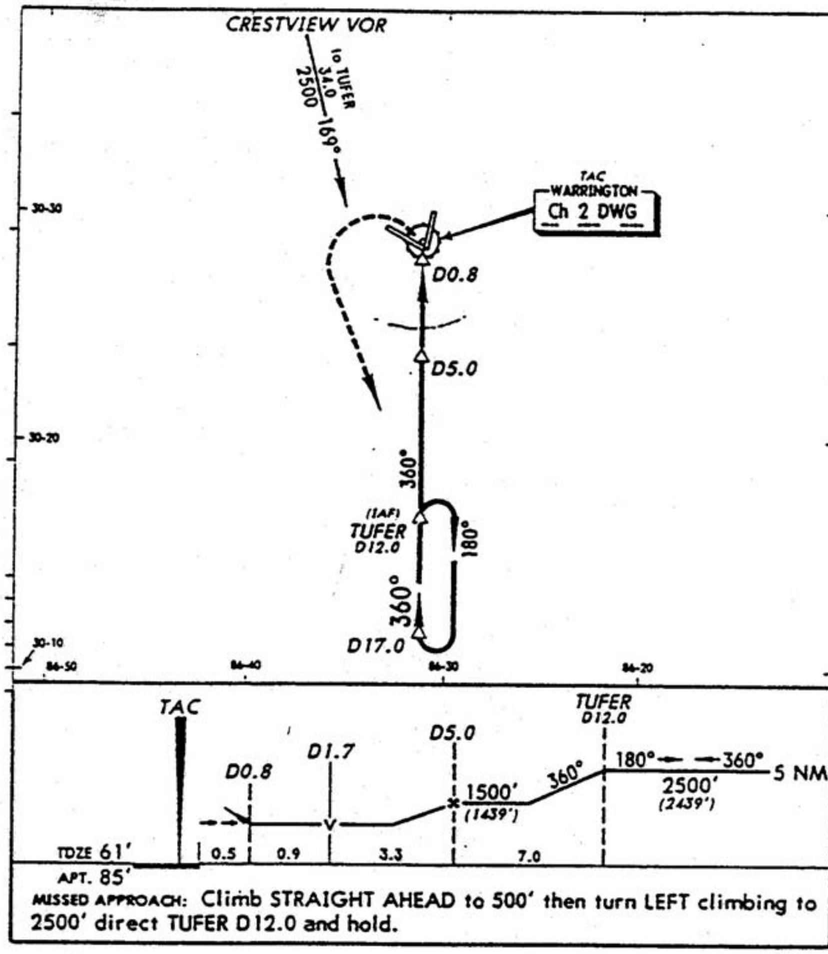

APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
T01	010	TUFER	IF	DWG	E_I	0120			02500	
T01	020	FF01	CF	DWG	E_F	0050	3600	0070	01500	
T01	030	RW01	CF	DWG	G___	0008	3600	0042	00111	-300
T01	040		VA		_M_		3600		00500	
T01	050	TUFER	DF		E___				02500	
T01	060	TUFER	HM	DWG	EE_H	0120	3600	001T	02500	

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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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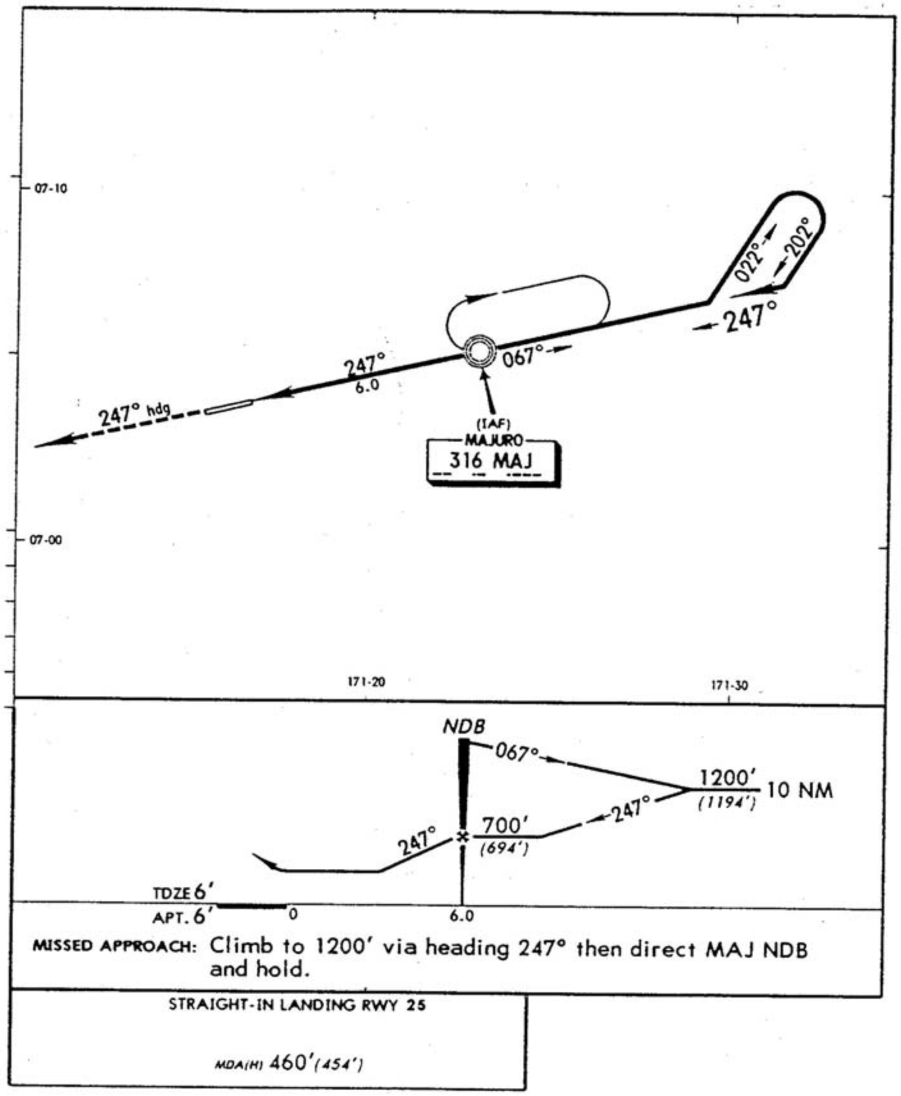

APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
N25	010	CF25	IF		E__I				01200	
N25	020	MAJ	CF	MAJ	E__F		2470	0035	00700	
N25	030	RW25	CF		G___		2470	0060	00056	-300
N25	040		CA				2470		01200	
N25	050	MAJ	DF		E___					
N25	060	MAJ	HM		EE_H		2470	001T		

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NDB CODING EXAMPLE 2

Excerpted from Jeppesen Chart Edmonton, Alberta, Canada, NDB Rwy 11 Approach Chart by permission of Jeppesen Sanderson, Inc.

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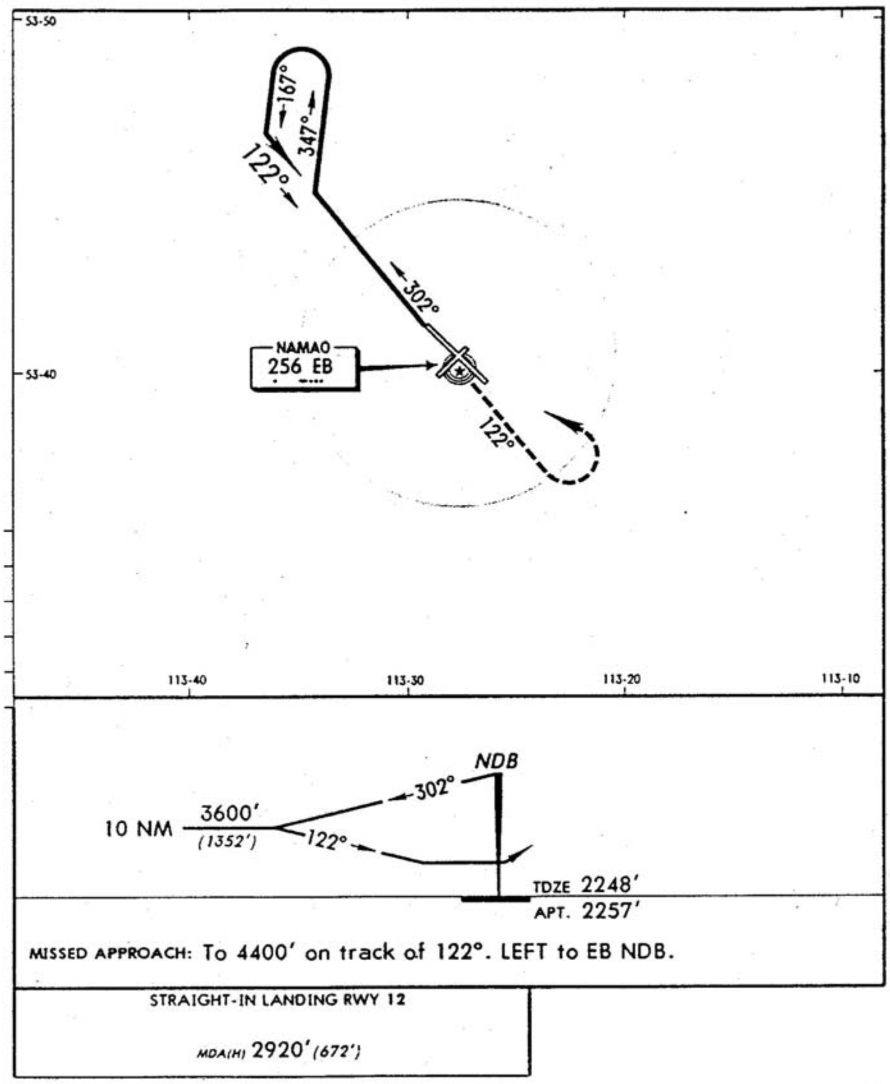

APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
N11	020	FF11	IF	EB	E_F				03600	
N11	030	RW11	CF		G___		1220	0055	02298	-300
N11	040	EB	CF	YEG	E_M_	0325	1220	0015	02657	
N11	050		CA				1220		04400	
N11	060	EB	DF	EB	EE__					

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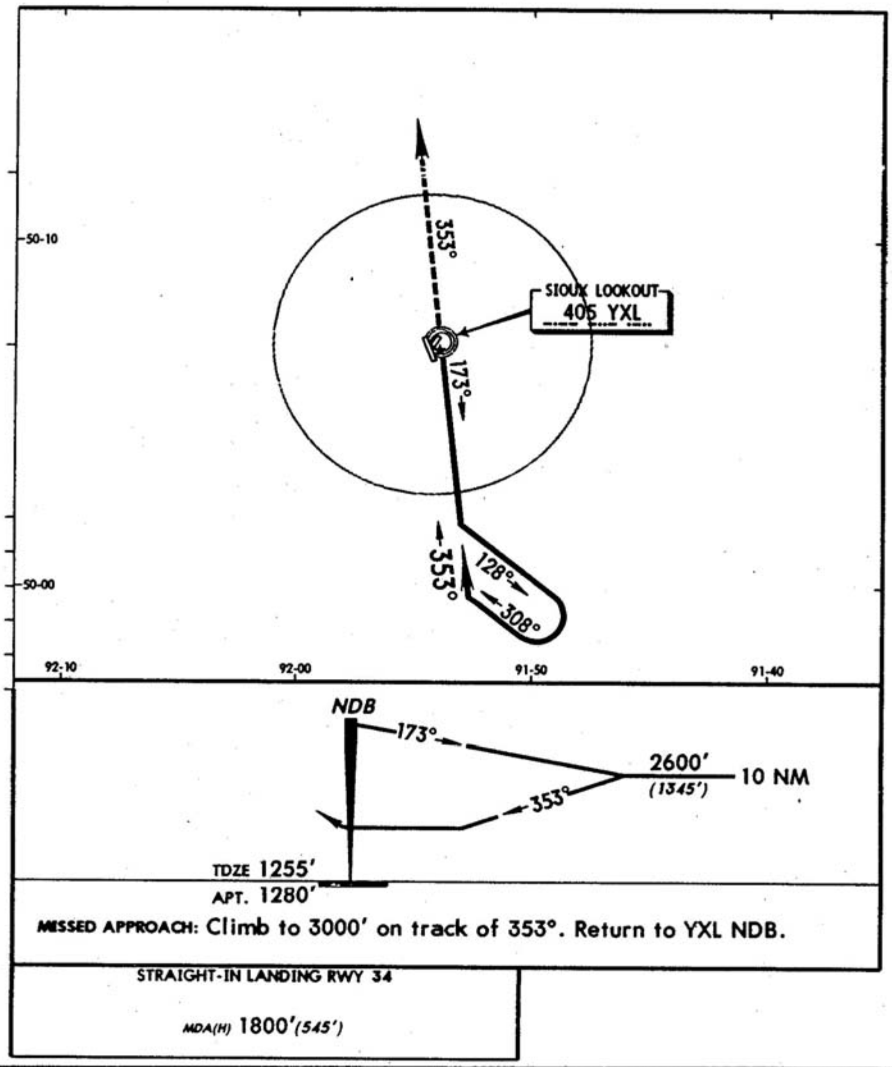
NDB CODING EXAMPLE 3

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_					

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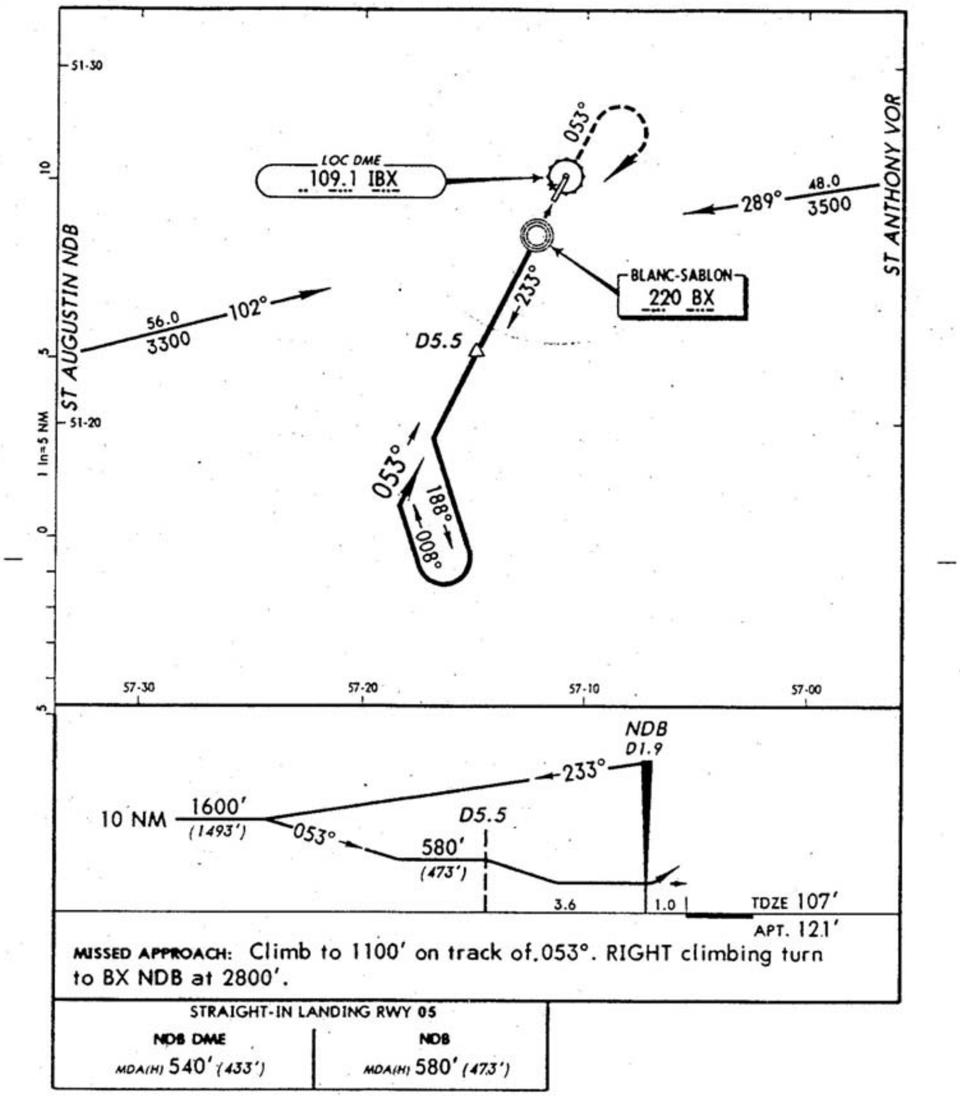
NDB CODING EXAMPLE 4

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__					

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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.

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.

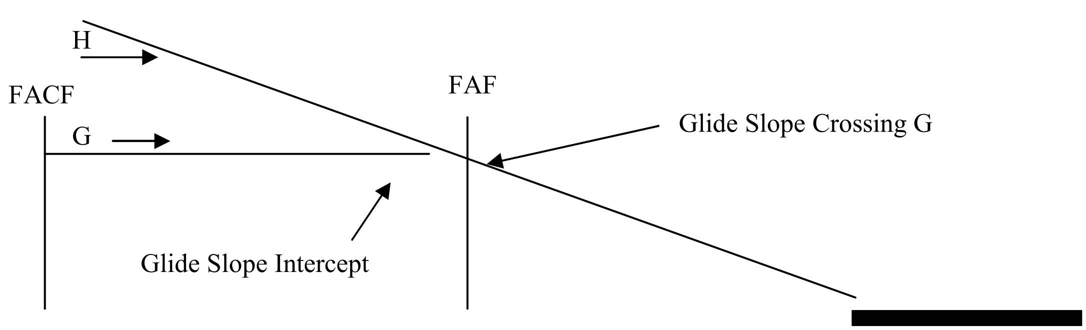
7.1.4 The track from the FACF to the FAF is coded as a CF or TF leg with altitude constraints as indicated for the specific procedure types below.

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. If the altitude 1 and 2 constraints for the FAF are "at" (G) and equal to the FACF altitude with an altitude description of "I," the vertical angle is omitted from the FAF record.

7.1.8 The Coding of FAF and FACF Altitude description fields are as follows:



	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	[1]	I
	State Defined Altitude is "at or above"	[3]	Glide Slope Intercept	[1]	J

NOTES:

[1] Glide Slope intercept altitudes are not specified as either "at" or "at or above."
[2] Reference Section 5.29
[3] FACF Altitude 1 may be blank. When it is blank, the Altitude Description is also blank, even when Altitude 2 is not blank.

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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 that 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 Rule 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 (Rule 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 (Rule 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 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 will be code as "RF" legs. Every leg preceding or following the "RF" leg will be tangent to the "RF" leg at that point.

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 Rule 7.4.2 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 Rule 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 Precision Approach Procedures Rule 6.4.2.

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APPROACH AND APPROACH TRANSITION CODING RULES

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.

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 no FAF is established in the government source, one will be computed according to Rule 6.2.5.2 of this Attachment. The fix, whether published or established, must carry the Final Approach Fix Waypoint Description code of "F" in position four of that code field. Note that only one record in a coded approach procedure can carry the "F" in position four of the Waypoint Description. Altitudes for this fix are coded in accordance with Rule 6.2.10.1 of this Attachment.

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 the official government source or computed. This vertical angle will only 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.

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.

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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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8.3.2 Final approach must include both a FAF and missed approach fix. The missed approach fix may be a runway or helipad fix or a designated missed approach point. Coding of a FACF is defined in Rule 6.2.5.

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. The final approach will include an FACF when one is required by Rule 6.2.5.

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 is not required unless specified by the state, or if required by leg type. The recommended navaid must be 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 Rule deleted by Supplement 17.

8.3.6.1 Rule deleted by Supplement 17.

8.3.6.2 Rule deleted by Supplement 17.

8.3.6.3 Rule deleted by Supplement 17.

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 Rule deleted by Supplement 17.

8.4.3 NDB + DME approach procedures must include a FAF and runway or helipad fix or missed approach point fix and all step-down fixes published in the vertical path. The final approach will include a FACF when one is required by Rule 6.2.5.

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.

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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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8.5 Intentionally Left Blank

8.6 Final Approach Path Coding - Circle-to-Land Procedures

Procedures which are Circle-To-Land 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, or in the Final End Point segment if a Final End Point is designated for the approach. Vertical angle information 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 (when coded) 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 or FAF, followed by "RF" to the FAF or MAP. According to the rules on "RF" legs, this must require that a straight line, fix terminated, approach transition to the FACF or FAF 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.

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

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8.9.1.1 The published TCH for a procedure used in these calculations is the procedure TCH or 50 feet when no TCH is published. TCH is further defined in Chapter Five, Sections 5.67 and 5.265 of this document.

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.

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 Examples 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.

8.9.9 If step-down fix is published in government source in the initial or intermediate segment, the fix and the appropriate altitude will be coded as part of the procedure. A vertical angle will be coded on the FAF waypoint that will ensure any step-down fix altitude in the intermediate segment FACF to FAF is cleared. Vertical angle information is not provided in the initial segment IAF to FACF. All step-down fixes will be coded with the appropriate altitude.

8.10 VNAV Coding of Non-Precision Approach Procedures With Missed Approach Points - Other Than Landing Threshold

Coding standards for Non-Precision Approach Procedures that have a published missed approach point other than the Landing Threshold Point (LTP) have been developed. Examples of coding three VNAV coding scenarios have been developed. The three examples are:

8.10.1 Missed Approach Point beyond the landing threshold, more than 0.14NM from the landing threshold and the published Final Approach Course crosses the landing threshold. The ARINC 424 rules for this case call for inserting the Landing Threshold Point as a fix in the procedure coding. See VNAV Coding Example A.

8.10.2 Missed Approach Point beyond the landing threshold, more than 0.14NM from the landing threshold and the published Final Approach Course does not cross the landing threshold, the Final Approach Course is no closer than 0.14NM to the landing threshold at any given point. ARINC 424 rules for this case call for inserting a Final End Point as a fix in the procedure coding. See Coding Example B.

8.10.3 Missed Approach Point is a Navaid beyond the landing threshold. The Navaid is within 0.14NM of the landing threshold. According to ARINC 424 rules, this Navaid will be coded as the missed approach point. No fixes will be inserted into the procedure coding. VNAV information will be provided on the Missed Approach Point sequence. See Coding Example C.

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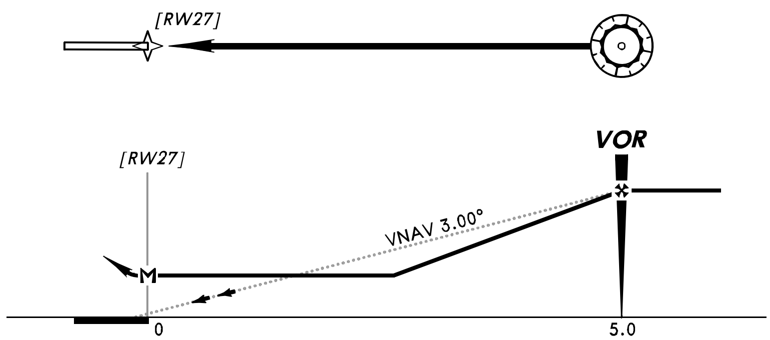
NON-PRECISION APPROACH CODING EXAMPLE 1

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.



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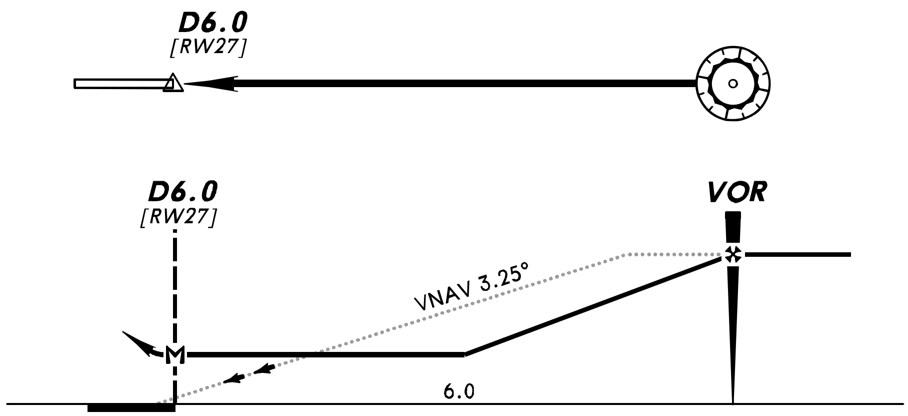
NON-PRECISION APPROACH CODING EXAMPLE 2

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



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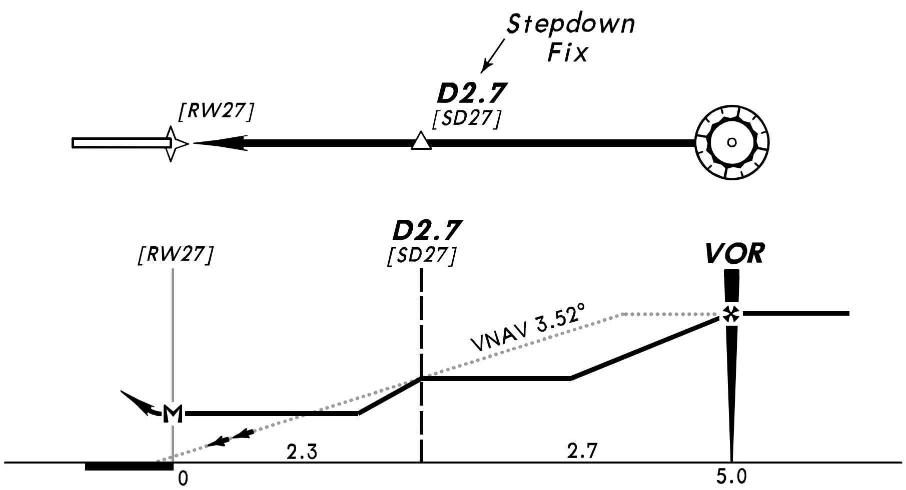
NON-PRECISION APPROACH CODING EXAMPLE 3

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.



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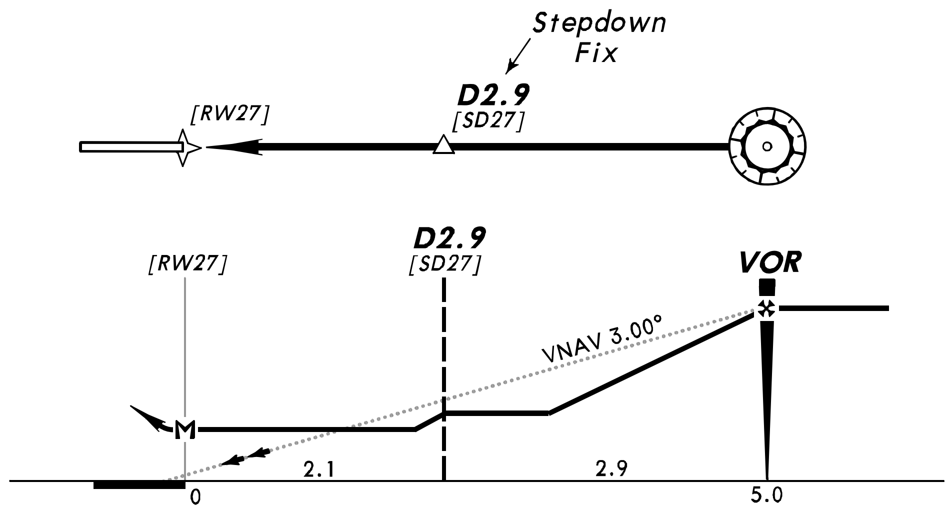
NON-PRECISION APPROACH CODING EXAMPLE 4

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.



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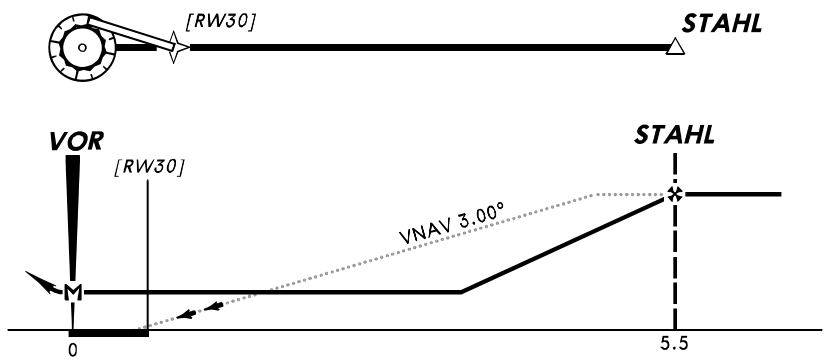
NON-PRECISION APPROACH CODING EXAMPLE 5

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.



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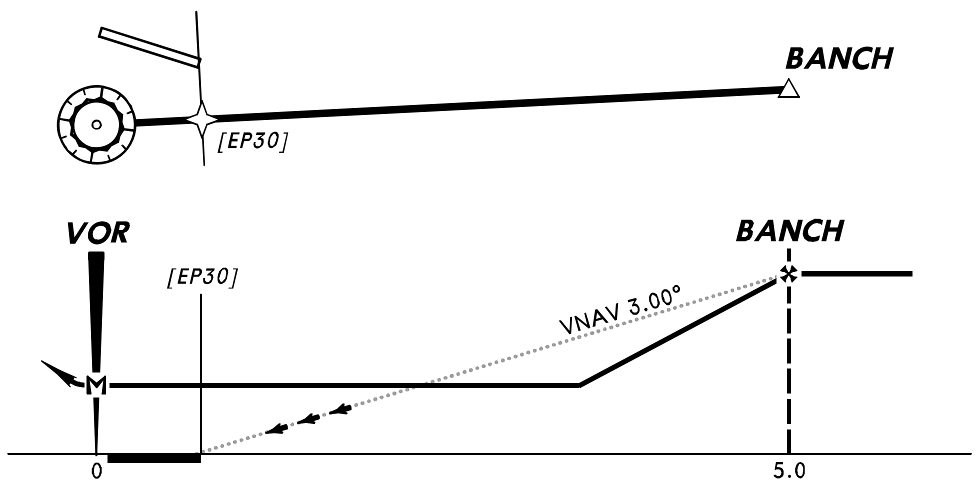
NON-PRECISION APPROACH CODING EXAMPLE 6

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.



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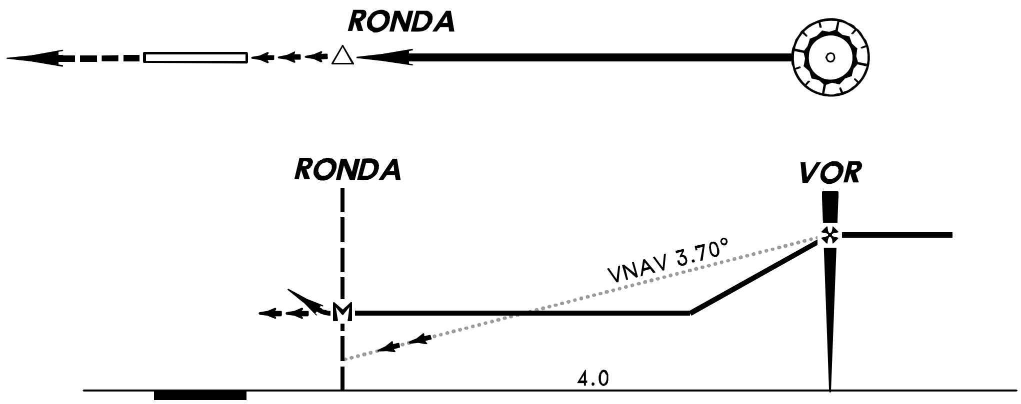
NON-PRECISION APPROACH CODING EXAMPLE 7

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.



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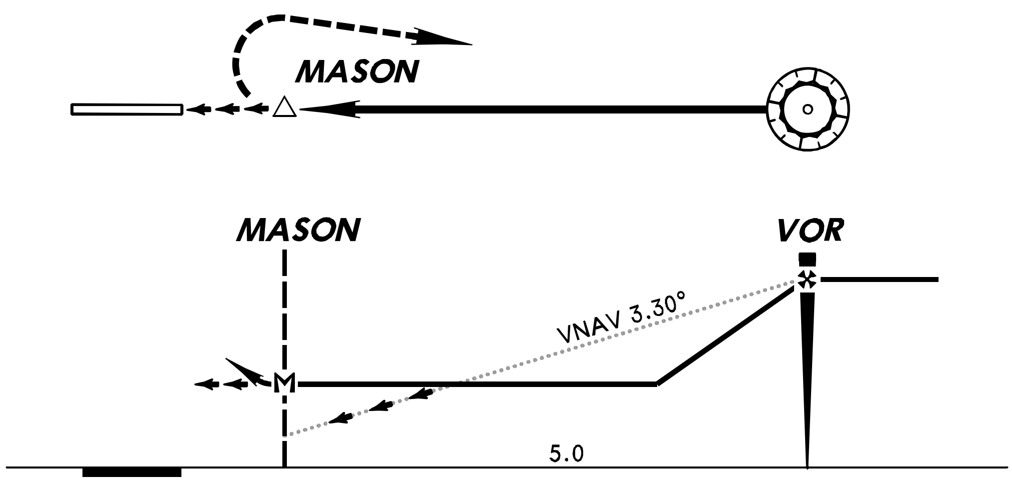
NON-PRECISION APPROACH CODING EXAMPLE 8

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.



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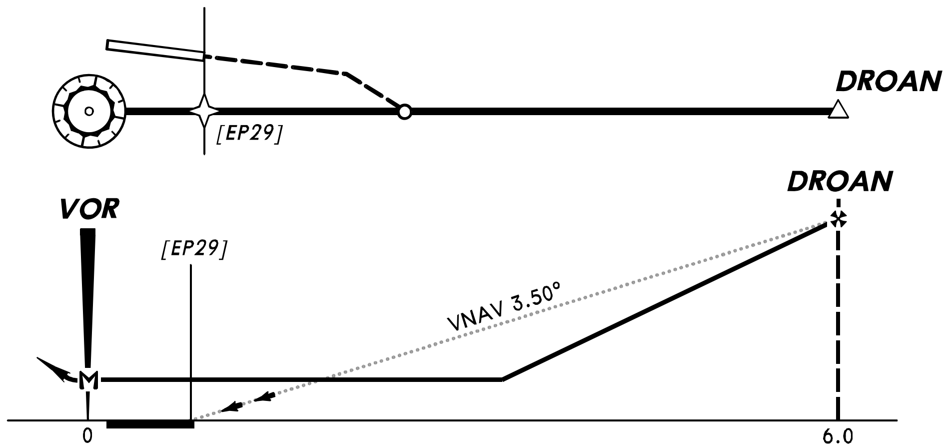
NON-PRECISION APPROACH CODING EXAMPLE 9

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.



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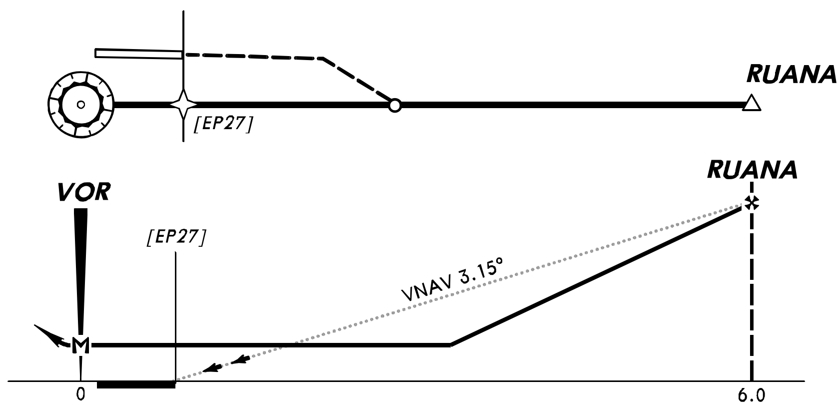
NON-PRECISION APPROACH CODING EXAMPLE 10

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.



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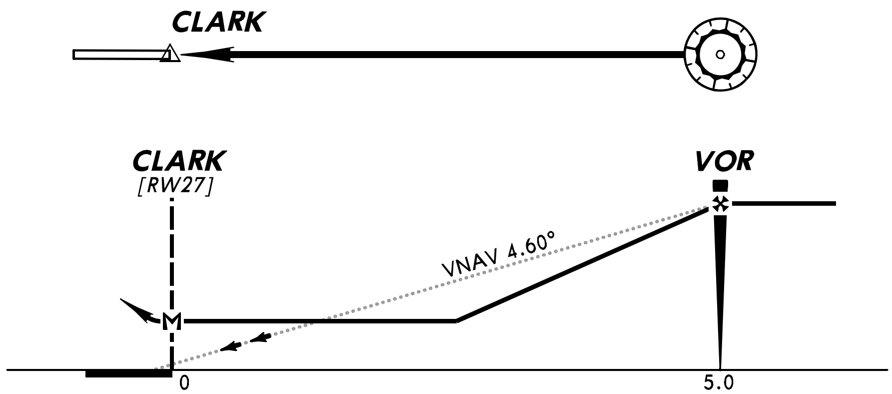
NON-PRECISION APPROACH CODING EXAMPLE 11

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.



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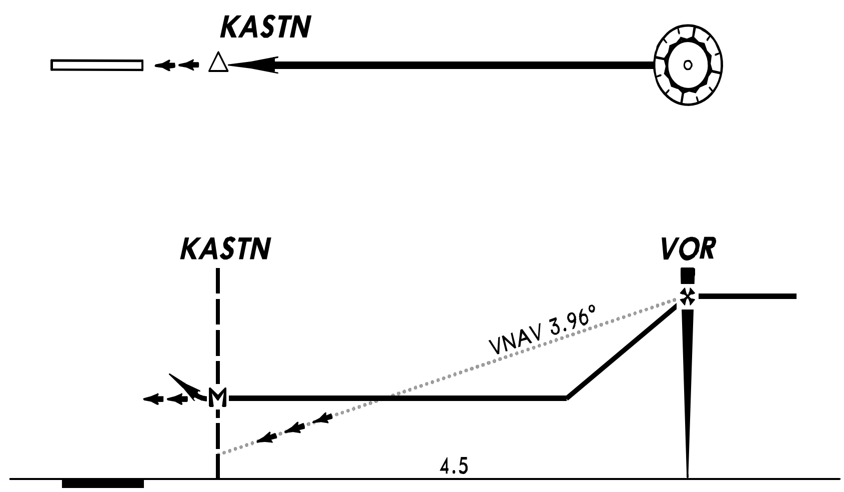
NON-PRECISION APPROACH CODING EXAMPLE 12

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.



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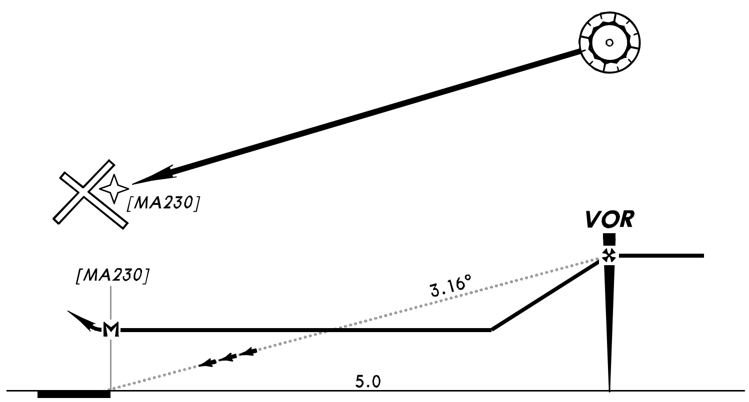
NON-PRECISION APPROACH CODING EXAMPLE 13

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.



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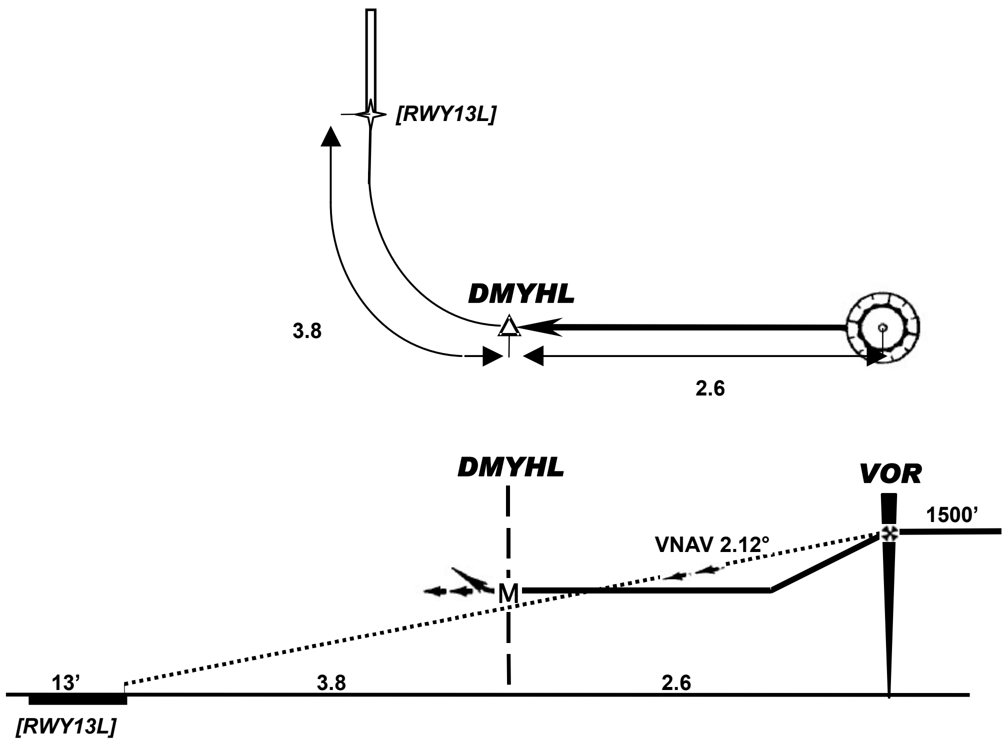
NON-PRECISION APPROACH CODING EXAMPLE 14

This example shows a Final Approach Fix (FAF) to Missed Approach Point (MAP) final approach path with the MAP before Landing Threshold (LTP). The MAP is located more than 0.1NM from LTP. The MAP position is the officially published government source position and coded in the MAP sequence. The procedure does not meet Straight-in landing requirement. The VNAV angle is calculated from a LTP + TCH elevation (or LTP + 50 feet if no TCH coded) to the FAF altitude considering the along track distance between LTP and FAF as shown below in dimensional lines. The altitude at the MAP is assigned based on computation, using the calculated VNAV angle.



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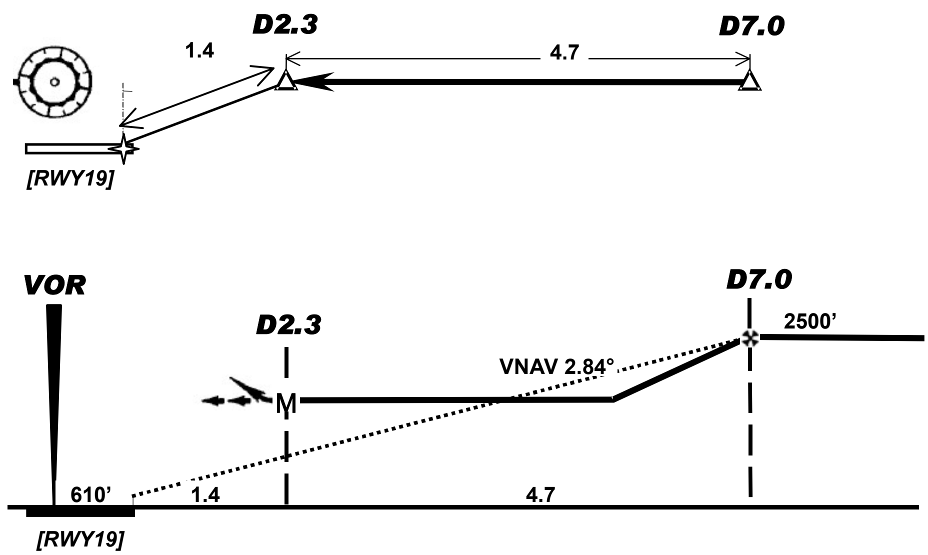
NON-PRECISION APPROACH CODING EXAMPLE 15

This example shows a Final Approach Fix (FAF) to Missed Approach Point (MAP) final approach path with the MAP before Landing Threshold (LTP) and runway parallel to last leg. The MAP is located more than 0.1NM from LTP. The MAP position is the officially published government source position and coded in the MAP sequence. The VNAV angle is calculated from a LTP + TCH elevation (or LTP + 50 feet if no TCH coded) to the FAF altitude and coded considering the along track distance between the abeam of the LTP on the final leg (noticed EP below) and the FAF as shown below in dimensional lines. The altitude at the MAP is assigned based on computation, using the calculated VNAV angle.



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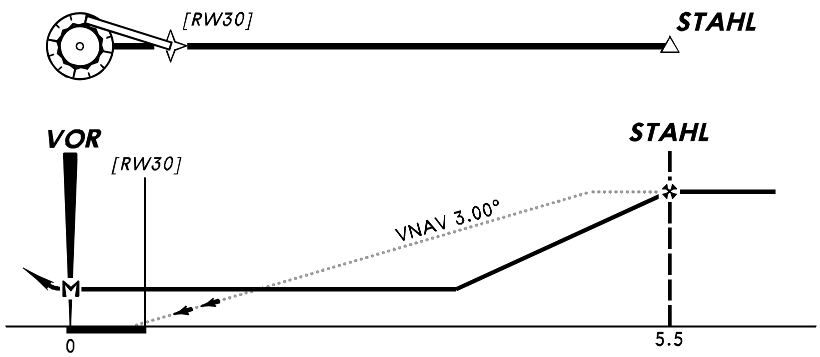
CODING EXAMPLE A
VNAV APPROACH CODING EXAMPLE

Inserted Runway Fix

This example shows a procedure published as Final Approach Fix (FAF) to a Missed Approach Point (MAP) beyond Landing Threshold Point (LTP). The final approach path crosses the LTP. The landing alignment is Straight-In. As the officially published MAP position is beyond the LTP, a "LTP Fix" waypoint (RW30) is inserted as an additional waypoint into the coding for this example. The VNAV angle is calculated from LTP + TCH or 50 feet, not the MAP, to the FAF altitude, and is coded in the "LTP Fix" sequence. The missed approach path is not included in the graphic. It is included in the coding sequence example. The inserted "LTP Fix" is coded as the MAP. The coded first leg of the missed approach path is a continuation of the Final Approach Course (FAC) to the officially published MAP. The first leg of the published missed approach path is a climb on the FAC to an altitude of airport elevation plus 400 feet, followed by a direct to fix at the FAF.



Inserted Runway Fix Coding:

APP ID	SEQ NR	FIX ID	P/T	WAYPOINT DESCRIPTION				MAG COURSE	DIST	ALT DESC/ALT	VERT ANGLE	ARINC REF.
D30	020	STAHL	IF	E			F	0.0	0.0	At or Above Procedure Altitude		Attachment Five, Rule 8.1.1
D30	030	RW30	CF	G	Y		M	Published FAC	4.7	At LTP + TCH or 50'	-3.00	Attachment Five, Rule 8.1.2 Rule 6.2.9.3 Rule 6.2.10.2.c
D30	040	VOR	CF	V		M		Published FAC	0.8			Attachment Five, Rule 6.2.10.2.c
D30	050		CA					Published FAC		At or Above Airport Plus 400'		Attachment Five, Rule 9.4.1.4
D30	050	STAHL	DF	E	E					At or Above Procedure Altitude		

Waypoint Description:
Column One - Fix Type: E = Waypoint, G = Runway, V = VHF Navaid
Column Two - E = End of Final Approach Coding, Y = Flyover waypoint
Column Three - M = First Leg of Missed Approach Procedure
Column Four - Fix Function in Coding: F = FAF, M = Missed Approach Fix
Note: FAF Altitude Description may be "at" when this is prescribed by source documentation. The altitude in sequence 050 may be a source provided value for the first leg of a missed approach or may be regionally adjusted to 500 feet above the airport. The At or Above Airport Plus 400' is the minimum requirement.

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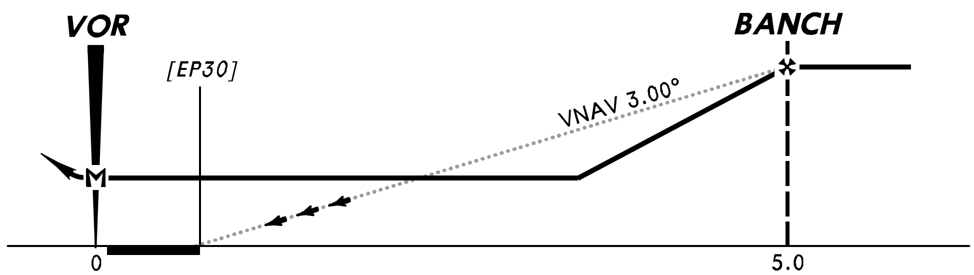
CODING EXAMPLE B
VNAV APPROACH CODING EXAMPLE

Inserted Final End Point Fix

This example shows a procedure published as Final Approach Fix (FAF) to a Missed Approach Point (MAP) beyond Landing Threshold Point (LTP). The final approach path does not cross the LTP. The landing alignment is Straight-in. As the MAP is located more than 0.14NM from LTP, a Final End Point Fix (FEP) waypoint is inserted as an additional waypoint into the coding for this example. The VNAV angle is calculated from a LTP + TCH or 50 feet elevation to the FAF altitude, references the FEP position and is coded in the FEP sequence. The missed approach path is not included in the graphic. It is included in the coding sequence example. The inserted "FEP Fix" is coded with its unique code. The coded first leg of the missed approach path is a continuation of the Final Approach Course (FAC) to the officially published MAP. The first leg of the published missed approach path is a climb on the FAC to an altitude of airport elevation plus 400 feet, followed by a direct to fix at the FAF.



Inserted Final End Point Fix Coding:

APP ID	SEQ NR	FIX ID	P/T	WAYPOINT DESCRIPTION				MAG COURSE	DIST	ALT DESC/ALT	VERT ANGLE	ARINC REF.
D30	020	BANCH	IF	E			F	0.0	0.0	At or Above Procedure Altitude		Attachment Five Rule 8.1.1
D30	030	EP30	CF	E	Y		E	Published FAC	4.1	At LTP + TCH or 50'	-3.00	Attachment Five Rule 8.1.2 Rule 6.2.9.4 Rule 6.2.10.2.d
D30	040	VOR	CF	V			M	Published FAC	0.9	At or Above Airport Plus 400'		Attachment Five, Rule 6.2.10.2.d
D30	050		CA			M		Published FAC		At or Above Airport Plus 400'		Attachment Five, Rule 9.4.1.4
D30	060	BANCH	DF	E	E					At or Above Procedure Altitude		

Waypoint Description:
Column One - Fix Type: E = Waypoint, V = VHF Navaid
Column Two - E = End of Final Approach Coding, Y = Flyover Waypoint
Column Three - M = First Leg of Missed Approach Procedure
Column Four - Fix Function in Coding: F = FAF, E, M; E = Final End Point
Note: FAF Altitude Description may be "at" when this is prescribed by source documentation. The altitude in sequence 040 and 050 may be a source provided value for the first leg of a missed approach or may be regionally adjusted to 500 feet above the airport. The At or Above Airport Plus 400' is the minimum requirement.

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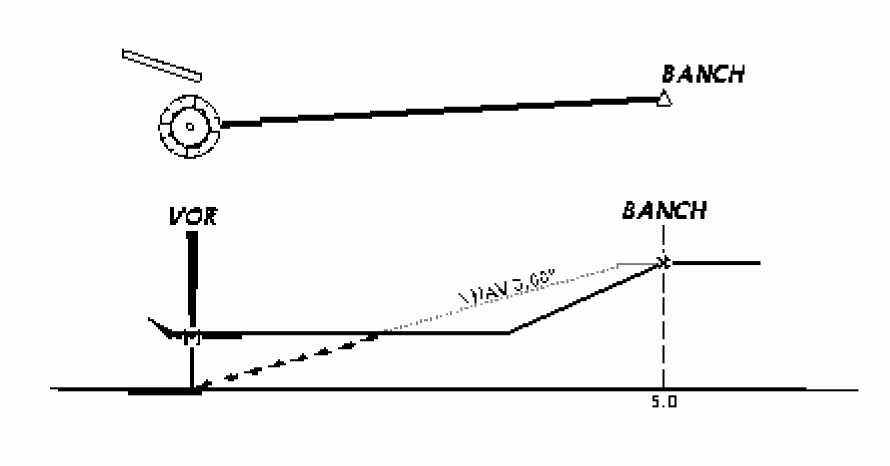
CODING EXAMPLE C
VNAV APPROACH CODING EXAMPLE

MAP is Navaid within 0.14NM of Landing Threshold

This example shows a procedure published as Final Approach Fix (FAF) to Missed Approach Point (MAP) beyond Landing Threshold Point (LTP). The final approach path does not cross the LTP. The landing alignment is Straight-in. As the officially published MAP is a Navaid located less than 0.14NM from LTP coding is to that fix and no waypoints are inserted. The VNAV angle is calculated from the MAP to the FAF altitude so as to ensure LTP + 50 feet elevation over the threshold, referencing the MAP position and is coded in the MAP sequence. The missed approach path is not included in the graphic. It is included in the coding sequence example. Coding is to the officially published MAP. The coded first leg of the missed approach path is a continuation of the Final Approach Course (FAC) and is a climb on the FAC to an altitude of airport elevation plus 400 feet, followed by a direct to fix at the FAF.



No inserted fixes, MAP is Navaid, beyond threshold but within 0.14NM Coding:

APP ID	SEQ NR	FIX ID	P/T	WAYPOINT DESCRIPTION				MAG COURSE	DIST	ALT DESC/ALT	VERT ANGLE	ARINC REF.
S29	020	BANCH	IF	E			F	0.0	0.0	At or Above Procedure Altitude		Attachment Five, Rule 8.1.1
S29	030	VOR	CF	V	Y		M	Published FAC	5.0	See Note Below	-3.00	Attachment Five, Rule 8.1.2, 6.2.5.3
S29	040		CA			M		Published FAC		At or Above Airport Plus 400'		Attachment Five, Rule 9.4.1.4
S29	050	BANCH	DF	E	E					At or Above Procedure Altitude		

Waypoint Description:
Column One - Fix Type: E = Waypoint, V = VHF Navaid
Column Two - E = End of Final Approach Coding, Y = Flyover Waypoint
Column Three - M = First Leg of Missed Approach Procedure
Column Four - Fix Function in Coding: F = FAF, M = Missed Approach Fix

Altitude/Altitude Description of MAP Sequence: Will be an At Altitude, calculated on the path that continues over the threshold at 50 feet. The altitude for the MAP Navaid will not be less than the threshold elevation. The FAF Altitude Description may be “at” when this is prescribed by source documentation. The altitude in sequence 040 may be a source provided value for the first leg of a missed approach or may be regionally adjusted to 500 feet above the airport. The At or Above Airport Plus 400' is the minimum requirement.

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APPROACH AND APPROACH TRANSITION CODING RULES

9.0 Missed Approach Procedure Rules Valid For All Procedure Types

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.

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.

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 will contain any government source provided altitude constraints. These altitudes may be provided as “At,” “At or Above,” “At or Below,” “At or Below to At or Above,” dependent on the government source documentation and coded in accordance with Section Five, Subsection 5.29 of this Specification. Except as indicated below, if the government source does not provide an altitude constraint for the first leg of the Missed Approach Procedure, none will be coded

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 values in the first leg of the Missed Approach Procedure, when coded, will be the source provided values.

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 if not specified by source. 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 values in the first leg of the Missed Approach Procedure, when provided, will be the source provided values.

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PATH AND TERMINATOR

APPROACH AND APPROACH TRANSITION CODING RULES

9.3.1.5 When an immediate turn is specified in an ILS, MLS, or GLS missed approach, or 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, using the approach course for the leg heading or course. The altitude will be coded as a minimum altitude, at least 400 feet above the airport elevation and the leg will terminate at that altitude.

9.4. Rule deleted by Supplement 17.

9.4.1 Rule deleted by Supplement 17.

9.4.1.1 Rule deleted by Supplement 17.

9.4.1.2 Rule deleted by Supplement 17.

9.4.1.3 Rule deleted by Supplement 17.

9.4.1.4 Rule deleted by Supplement 17.

9.4.1.5 Rule deleted by Supplement 17.

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 The procedure reference Navaid must be used as the Recommended Navaid when required, 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 Rule deleted by Supplement 17.

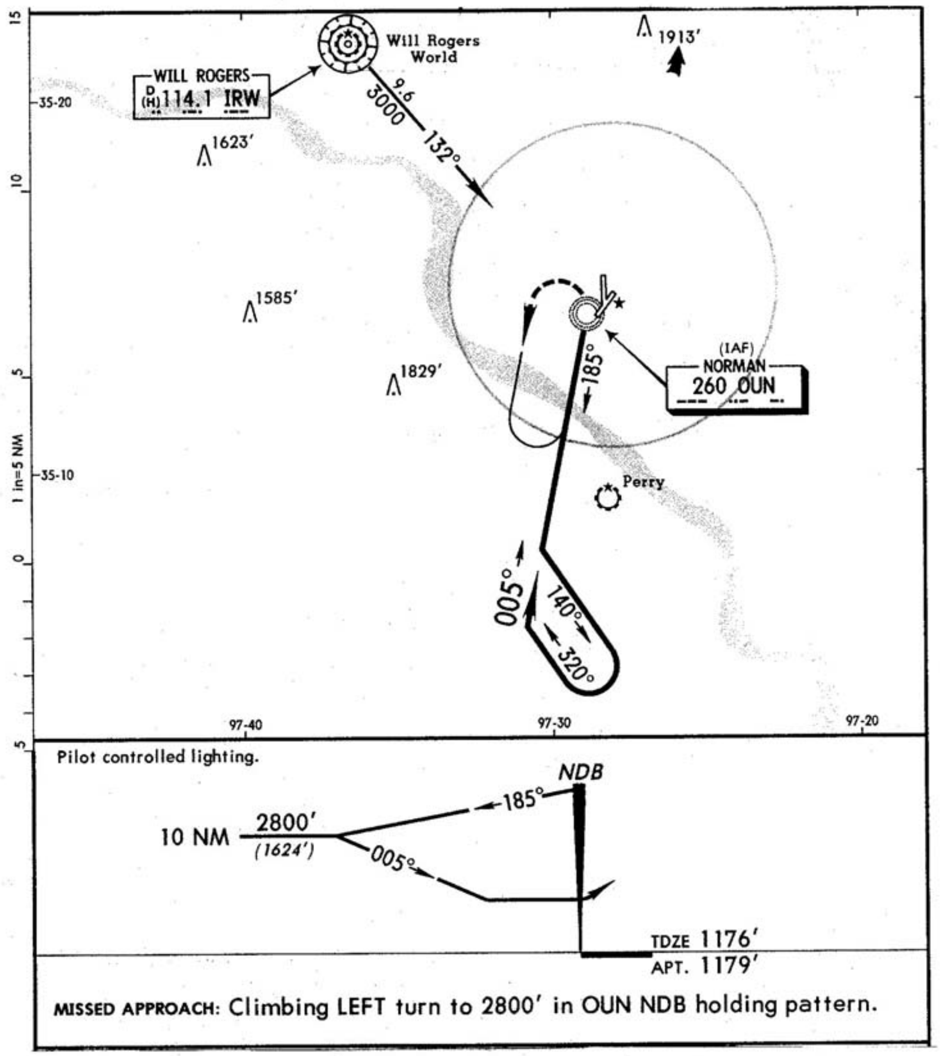
9.5.2.3 The first leg of the Missed Approach Procedure may be a CR or a VR leg. For these legs, a VOR facility (without or without DME) may be used as the Recommended Navaid. When the facility has no DME, the Rho field is left blank and the VOR radial is ente red in the Theta field.

9.5.2.4 When the first leg of a Missed Approach Procedure is coded as a “HA or HM” leg, the coding will also include a government source provided altitude.

ATTACHMENT 5
PATH AND TERMINATOR

MISSED APPROACH CODING EXAMPLE 1

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

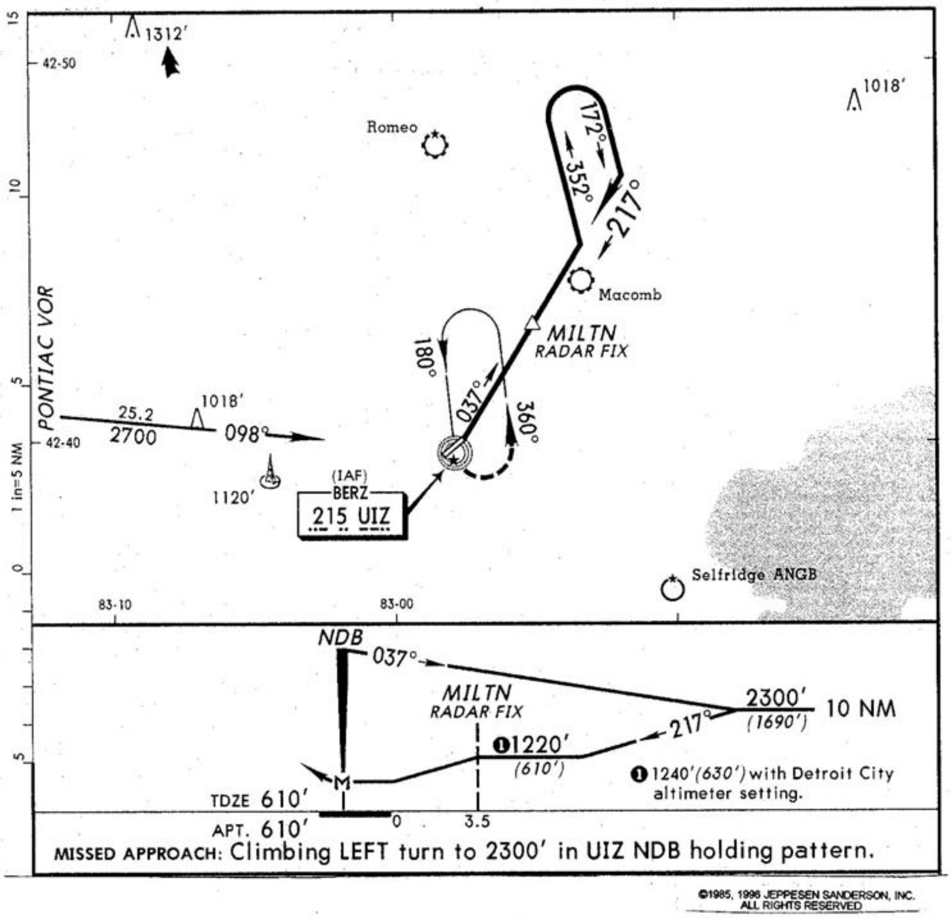


APP ID	SEQ NR	FIX ID	P/T	RECD NAV	W/P DESC	RHO	MAG CRS	DIST	ALT	VERT ANG
N03	020	FN03	IF	OUN	E_F				01680	
N03	030	OUN	CF		E_M		0050	0040	01680	000
N03	040	OUN	HM		EEMH		0050	001T	02800	

ATTACHMENT 5
PATH AND TERMINATOR

MISSED APPROACH CODING EXAMPLE 2

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
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 attended Subcommittee meetings held in September 1974 and January 1975.

APPENDIX 1
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

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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
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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
J. Nelson Seto	BOEING COMPANY	Seattle, Washington
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J. F. Haberl	CANADIAN MARCONI COMPANY	Montreal, Quebec, Canada
R. K. Paull	CANADIAN MARCONI COMPANY	Montreal, Quebec, Canada
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Roy L. Neff	COLLINS RADIO COMPANY	Cedar Rapids, Iowa
Jack Ringland	COLLINS RADIO COMPANY	Cedar Rapids, Iowa
Marvin H. Schmidt	COLLINS RADIO COMPANY	Cedar Rapids, Iowa
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Ronald M. Fry	DELCO ELECTRONICS	Milwaukee, Wisconsin
L. David Lewis	DELCO ELECTRONICS	Milwaukee, Wisconsin
Robert E. Oliver	DELCO ELECTRONICS	Goleta, California
Rudy Poklar	DELCO ELECTRONICS	Milwaukee, Wisconsin
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Roderic Nevin	EDMAC ASSOCIATES, INC.	East Rochester, New York
Adrian M. Zeffert	EDO COMMERCIAL CORPORATION	Melville, New York
Edgar A. Post	FEDERAL AVIATION ADMINISTRATION	Washington, D.C.
A. W. Randall	FEDERAL AVIATION ADMINISTRATION	Washington, D.C.
G. Tomsic	FEDERAL AVIATION ADMINISTRATION	Washington, D.C.
Tony Plattner	GARRETT CORPORATION	Los Angeles, California
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
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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
Donald Baker	SPERRY FLIGHT SYSTEMS	Phoenix, Arizona

APPENDIX 1
CHRONOLOGY AND BIBLIOGRAPHY

Larry Bowe	SPERRY FLIGHT SYSTEMS	Phoenix, Arizona
C. A. Hall	SPERRY FLIGHT SYSTEMS	Phoenix, Arizona
William Post	SPERRY FLIGHT SYSTEMS	Phoenix, Arizona
Daniel A. Giroux	THOMSON-CSF, INC.	Paris, France
J. Lane Ware	THOMSON-CSF, INC.	New York, New York

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.

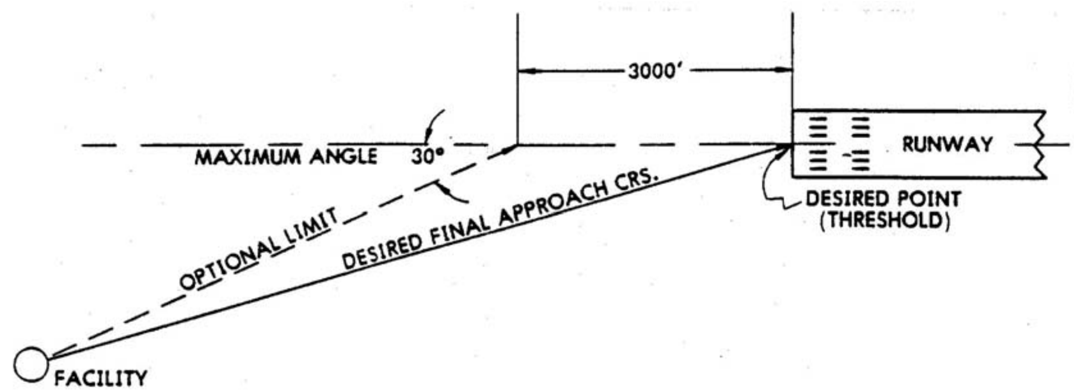

Figure AP2-1
Alignment Options for Final Approach Course Off-Airport VOR with FAF, Straight-In Approach

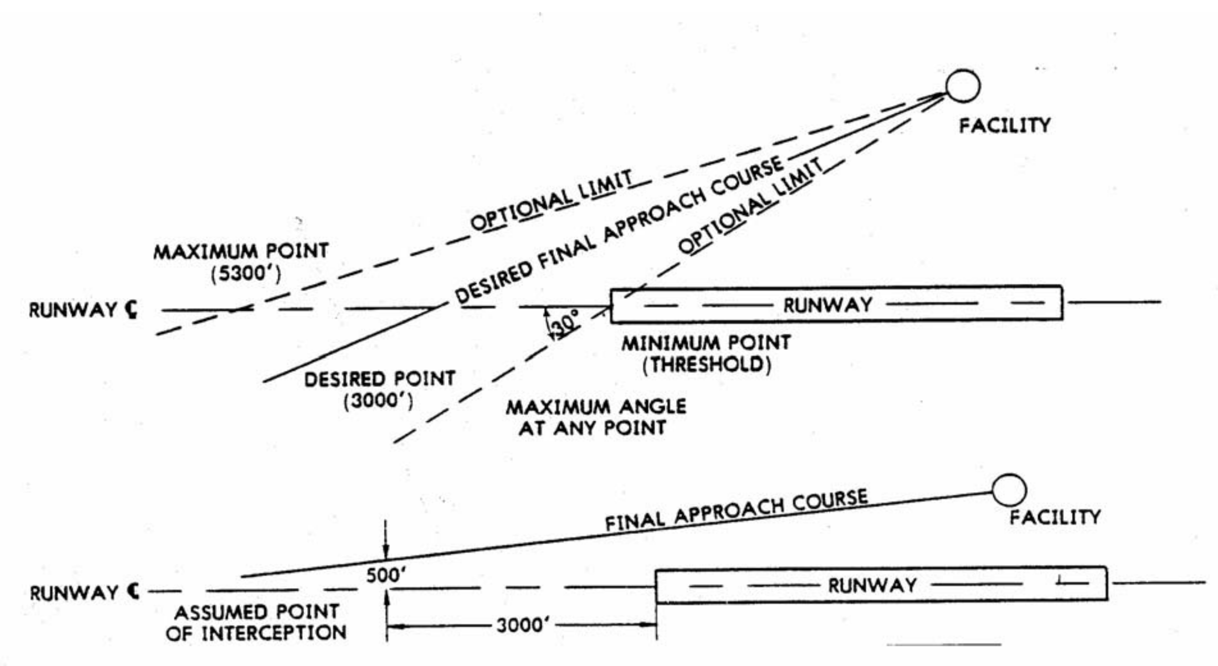

Figure AP2-2
Alignment Options for Final Approach Course On-Airport with FAF, Straight-In Approach

APPENDIX 2
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

The MAP is located at a point on final approach track which is not farther from the FAF than the facility.

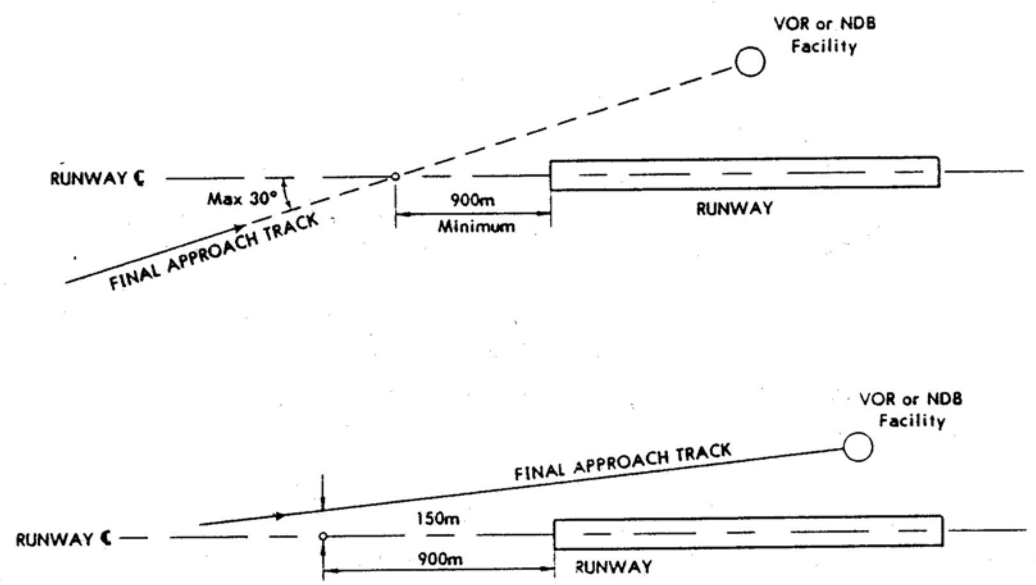

Figure AP2-3
Alignment Options for Final Approach Course Off-Airport VOR with FAF, Straight-In Approach

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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.

3.0 RNAV DATA – ORGANIZATION AND CONTENT (cont'd)

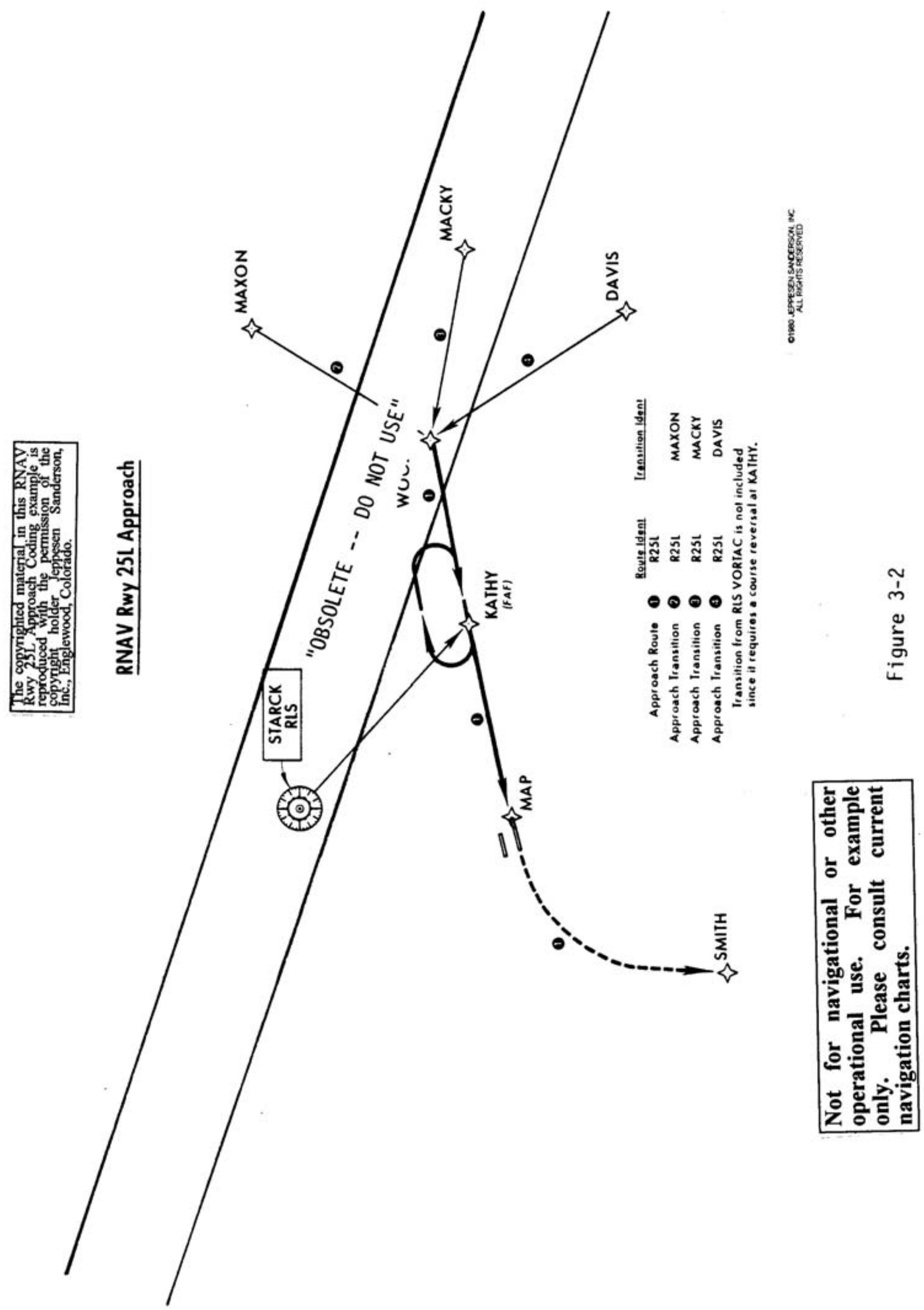


Figure 3-2

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.

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.

4.3.2 Continuation Records

Column	Field Name (Length)	Reference
1 thru 36	Fields as of 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)

"OBSOLETE -- DO NOT USE"

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

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)

"OBSOLETE -- DO NOT USE"

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

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

Note: 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)

"OBSOLETE -- DO NOT USE"

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)	

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 officical 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

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

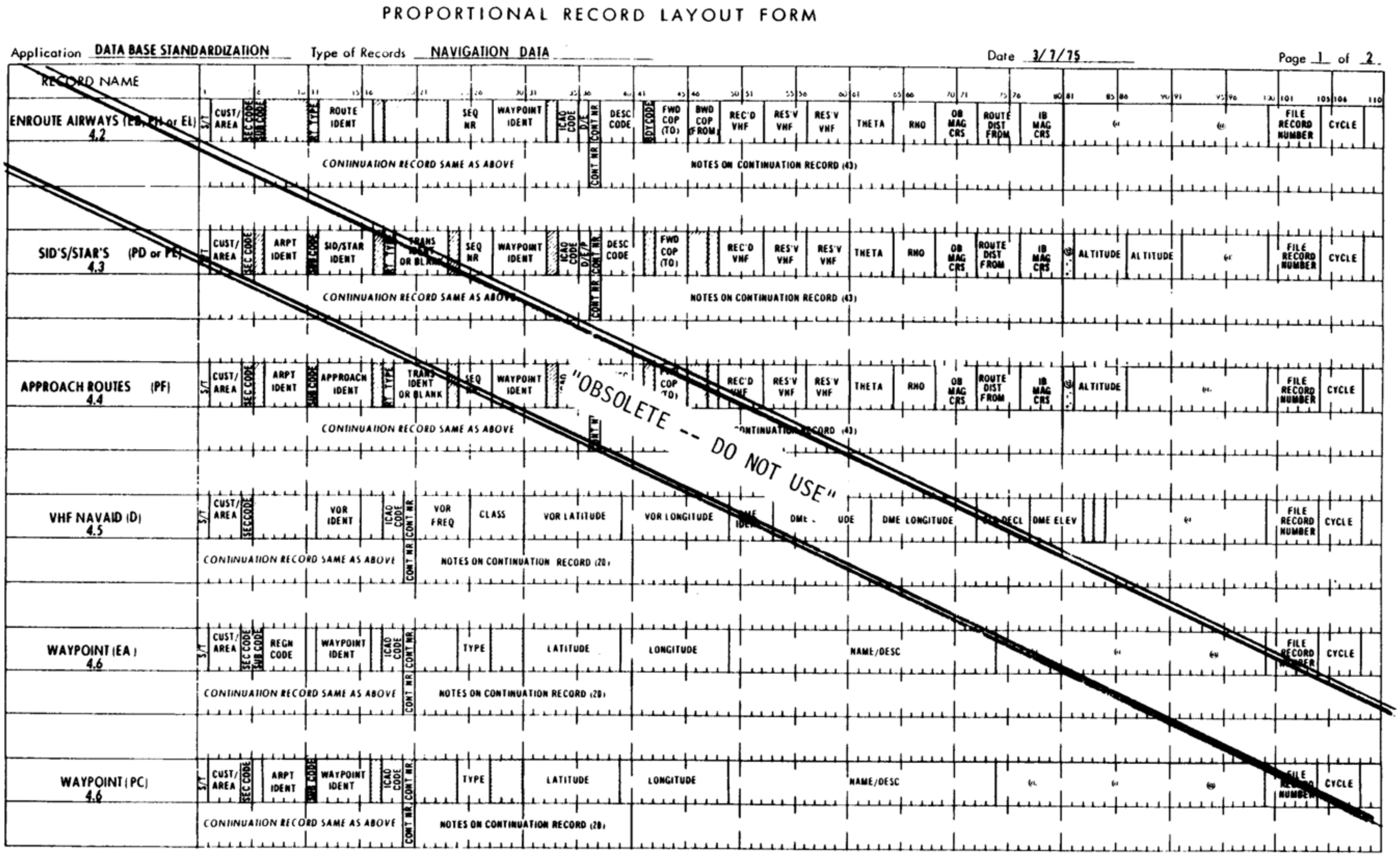
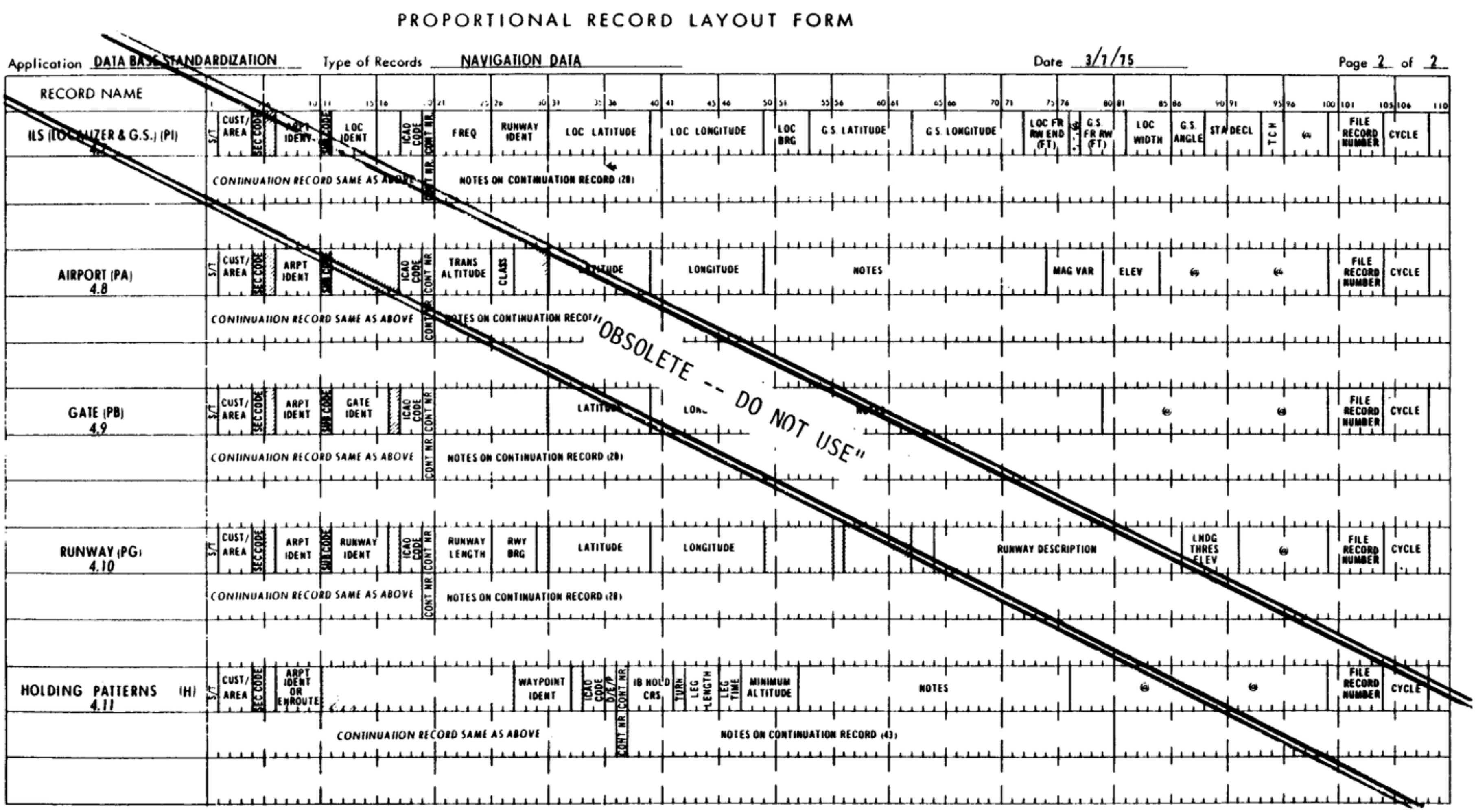

PROPORTIONAL RECORD LAYOUT FORM
Application DATA BASE STANDARDIZATION
Type of Records NAVIGATION DATA
Date 3/7/75
Page 1 of 2
RECORD NAME
ENROUTE AIRWAYS (EB, EH or EL) 4.2
S/T CUST/AREA SEC CODE SUB CODE RT TYPE ROUTE IDENT SEQ NR WAYPOINT IDENT ICAO CODE D/E CONT NR DESC CODE BDY CODE FWD COP (TO) BWD COP (FROM) REC'D VHF RES'V VHF RES'V VHF THETA RHO OB MAG CRS ROUTE DIST FROM IB MAG CRS FILE RECORD NUMBER CYCLE
CONTINUATION RECORD SAME AS ABOVE CONT NR NOTES ON CONTINUATION RECORD (43)
SID'S/STAR'S (PD or PE) 4.3
S/T CUST/AREA SEC CODE ARPT IDENT SUB CODE SID/STAR IDENT RT TYPE TRANS IDENT OR BLANK SEQ NR WAYPOINT IDENT ICAO CODE D/E/P CONT NR DESC CODE FWD COP (TO) REC'D VHF RES'V VHF RES'V VHF THETA RHO OB MAG CRS ROUTE DIST FROM IB MAG CRS ALTITUDE ALTITUDE FILE RECORD NUMBER CYCLE
CONTINUATION RECORD SAME AS ABOVE CONT NR NOTES ON CONTINUATION RECORD (43)
APPROACH ROUTES (PF) 4.4
S/T CUST/AREA SEC CODE ARPT IDENT SUB CODE APPROACH IDENT RT TYPE TRANS IDENT OR BLANK SEQ NR WAYPOINT IDENT COP (TO) REC'D VHF RES'V VHF RES'V VHF THETA RHO OB MAG CRS ROUTE DIST FROM IB MAG CRS ALTITUDE FILE RECORD NUMBER CYCLE
CONTINUATION RECORD SAME AS ABOVE CONTINUATION RECORD (43)
VHF NAVAID (D) 4.5
S/T CUST/AREA SEC CODE VOR IDENT ICAO CODE CONT NR VOR FREQ CLASS VOR LATITUDE VOR LONGITUDE DME IDENT DME LATITUDE DME LONGITUDE DECL DME ELEV FILE RECORD NUMBER CYCLE
CONTINUATION RECORD SAME AS ABOVE CONT NR NOTES ON CONTINUATION RECORD (28)
WAYPOINT (EA) 4.6
S/T CUST/AREA SEC CODE SUB CODE REGN CODE WAYPOINT IDENT ICAO CODE CONT NR TYPE LATITUDE LONGITUDE NAME/DESC FILE RECORD NUMBER CYCLE
CONTINUATION RECORD SAME AS ABOVE CONT NR NOTES ON CONTINUATION RECORD (28)
WAYPOINT (PC) 4.6
S/T CUST/AREA SEC CODE ARPT IDENT SUB CODE WAYPOINT IDENT ICAO CODE CONT NR TYPE LATITUDE LONGITUDE NAME/DESC FILE RECORD NUMBER CYCLE
CONTINUATION RECORD SAME AS ABOVE CONT NR NOTES ON CONTINUATION RECORD (28)
"OBSOLETE -- DO NOT USE"

Figure 4-1


PROPORTIONAL RECORD LAYOUT FORM

Application DATA BASE STANDARDIZATION Type of Records NAVIGATION DATA Date 3/1/75 Page 2 of 2

RECORD NAME

ILS (LOCALIZER & G.S.) (PI) 4.7
S/T | CUST/AREA | SEC CODE | ARPT IDENT | SUB CODE | LOC IDENT | ICAO CODE | CONT NR | FREQ | RUNWAY IDENT | LOC LATITUDE | LOC LONGITUDE | LOC BRG | G.S. LATITUDE | G.S. LONGITUDE | LOC FR RW END (FT) | G.S. FR RW (FT) | LOC WIDTH | G.S. ANGLE | STA DECL | TCH | FILE RECORD NUMBER | CYCLE
CONTINUATION RECORD SAME AS ABOVE | CONT NR | NOTES ON CONTINUATION RECORD (28)

AIRPORT (PA) 4.8
S/T | CUST/AREA | SEC CODE | ARPT IDENT | SUB CODE | ICAO CODE | CONT NR | TRANS ALTITUDE | CLASS | LATITUDE | LONGITUDE | NOTES | MAG VAR | ELEV | FILE RECORD NUMBER | CYCLE
CONTINUATION RECORD SAME AS ABOVE | CONT NR | NOTES ON CONTINUATION RECORD

GATE (PB) 4.9
S/T | CUST/AREA | SEC CODE | ARPT IDENT | SUB CODE | GATE IDENT | ICAO CODE | CONT NR | LATITUDE | LONGITUDE | NOTES | FILE RECORD NUMBER | CYCLE
CONTINUATION RECORD SAME AS ABOVE | CONT NR | NOTES ON CONTINUATION RECORD (28)

RUNWAY (PG) 4.10
S/T | CUST/AREA | SEC CODE | ARPT IDENT | SUB CODE | RUNWAY IDENT | ICAO CODE | CONT NR | RUNWAY LENGTH | RWY BRG | LATITUDE | LONGITUDE | RUNWAY DESCRIPTION | LNDG THRES ELEV | FILE RECORD NUMBER | CYCLE
CONTINUATION RECORD SAME AS ABOVE | CONT NR | NOTES ON CONTINUATION RECORD (28)

HOLDING PATTERNS (H) 4.11
S/T | CUST/AREA | SEC CODE | ARPT IDENT OR ENROUTE | WAYPOINT IDENT | ICAO CODE | D/E/P | CONT NR | IB HOLD CRS | TURN | LEG LENGTH | LEG TIME | MINIMUM ALTITUDE | NOTES | FILE RECORD NUMBER | CYCLE
CONTINUATION RECORD SAME AS ABOVE | CONT NR | NOTES ON CONTINUATION RECORD (43)

"OBSOLETE -- DO NOT USE"

Figure 4-1 (cont'd)

AERONAUTICAL RADIO, INC.
2551 Riva Road
Annapolis, Maryland 21401-7465 USA

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, FD, IF VA, VD, VI, VR or VM followed by CF or DF	AF, CF, DF, HA, IF
STAR	AF, FC, FD, IF	AF, CF, DF, FM, TF, VM
SID Route Transition	AF, FA, FC, 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.

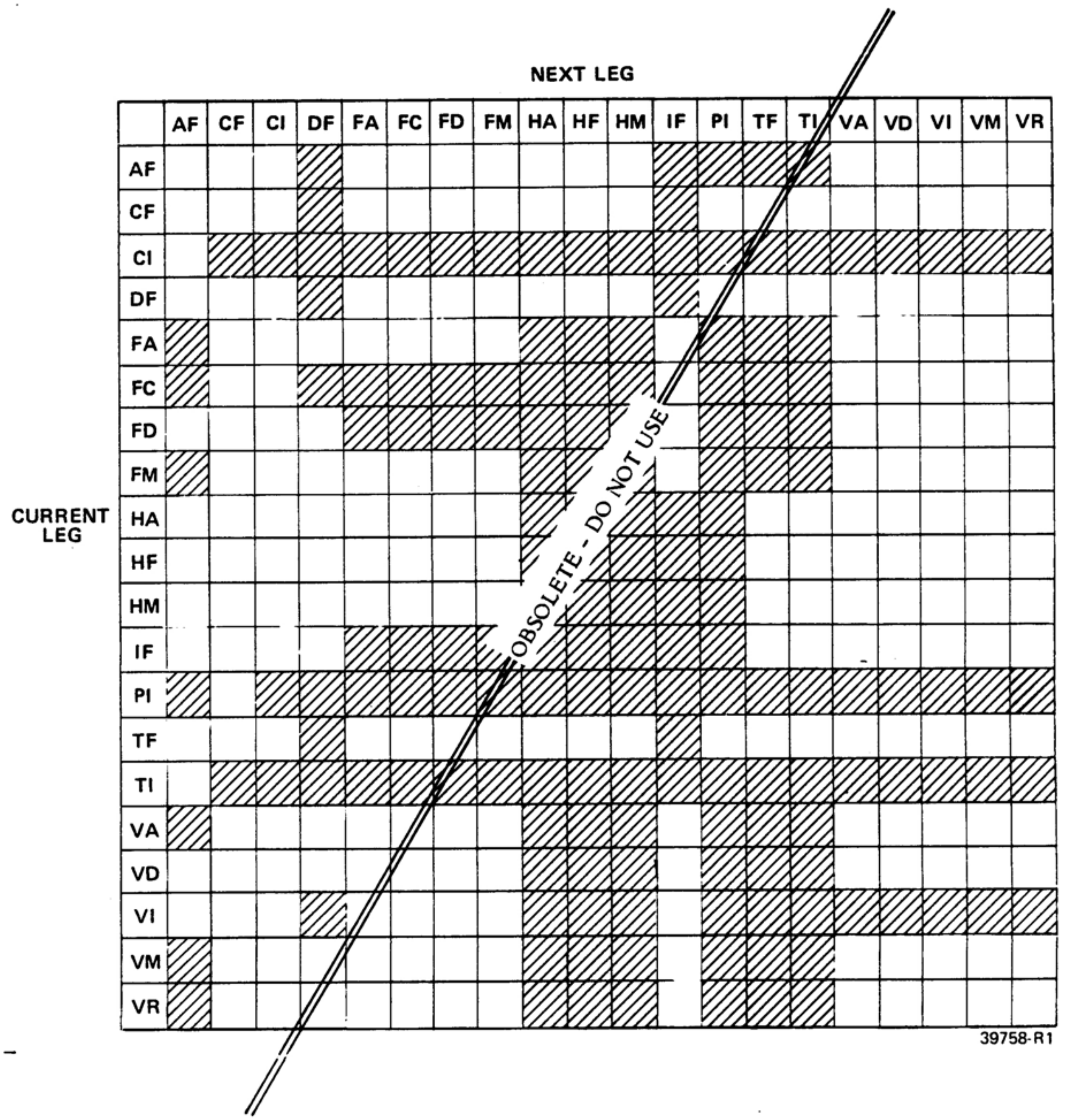
D. Table 2 illustrates the leg types available for coding.

* THIS ATTACHMENT WAS INTRODUCED INTO SPECIFICATION 424 BY SUPPLEMENT NO. 1.

ATTACHMENT 5 (cont'd)

PATH AND TERMINATOR

GENERAL RULES

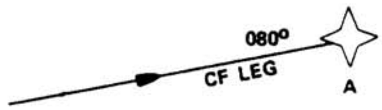
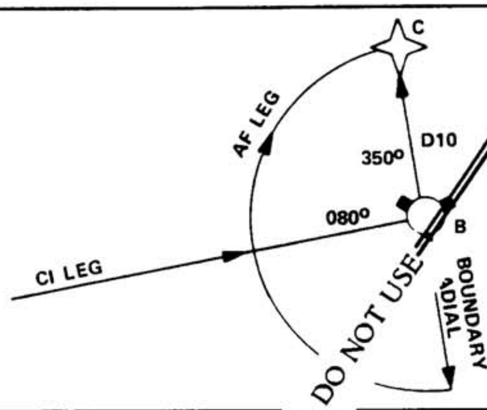
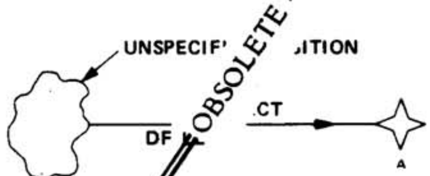
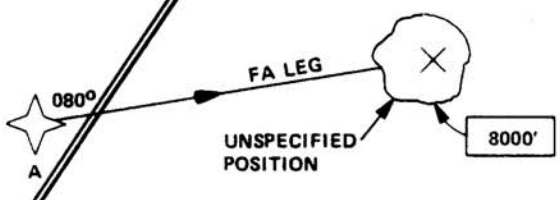


Leg Sequence
Table 1

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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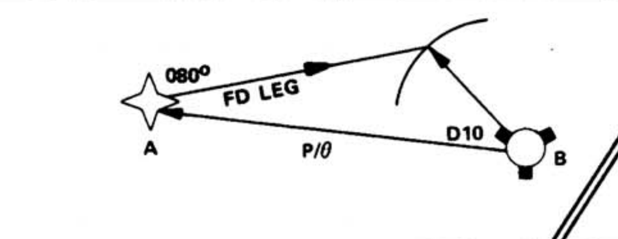
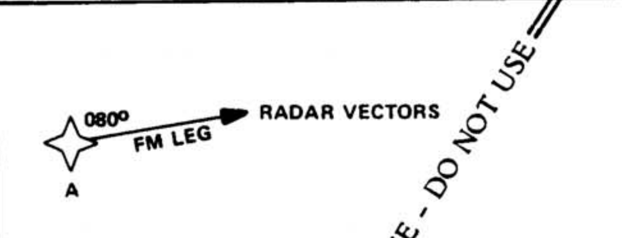
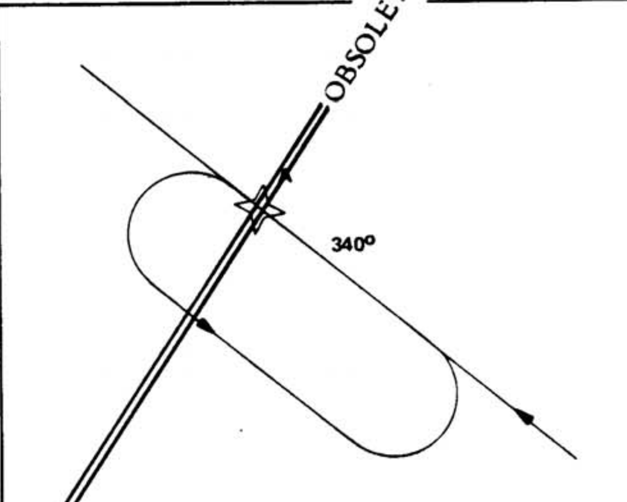
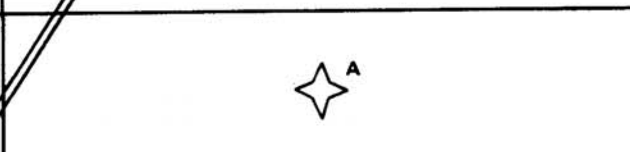
Leg Type Illustrations
Table 2

ATTACHMENT 5 (cont'd)

PATH AND TERMINATOR
GENERAL RULES

OBSOLETE - DO NOT USE

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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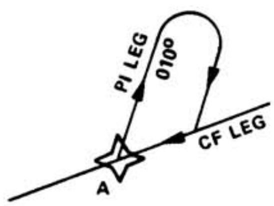
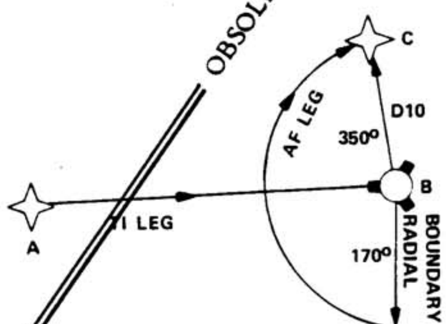
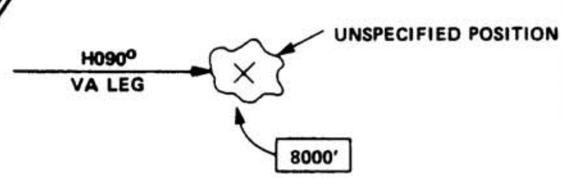
Leg Type Illustrations
Table 2 (cont)

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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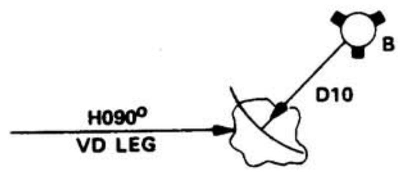
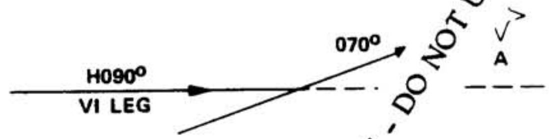
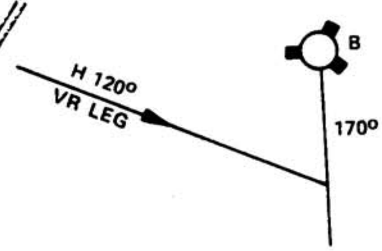
Leg Type Illustrations
Table 2 (cont)

ATTACHMENT 5 (cont'd)

PATH AND TERMINATOR GENERAL RULES

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)

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.

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

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

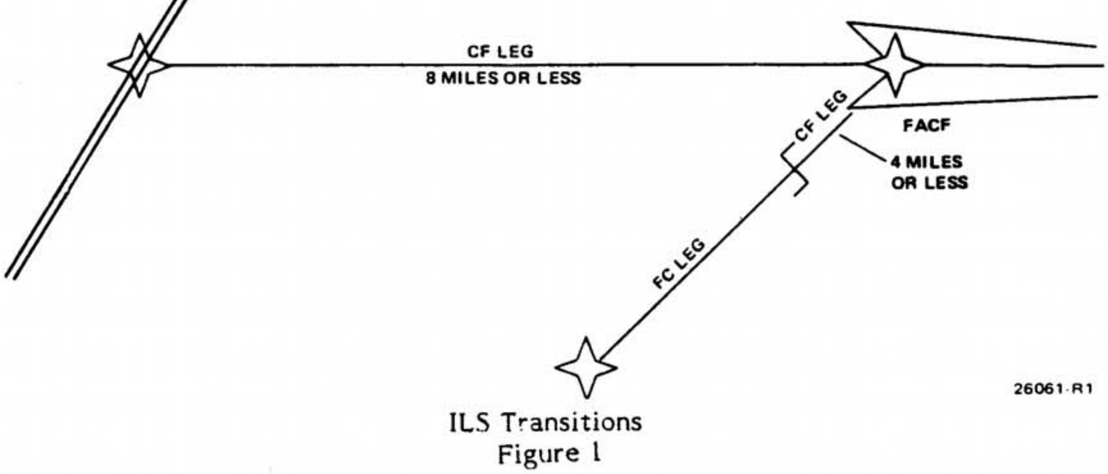
   c. Procedure turn (PI le

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.



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 approach will 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.

OBSOLETE
DO NOT USE

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. 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 CF legs to the runway fix.

												(SID – NO TRANS. STAR AND TRANS)		
T	IP	R	KSFO	K2	P	KDFW	K4	P	01021	BCE	001	<LNDN5 (RW28B), MELTS + K2/USA/... SONNY + K2. J92, MVA + K2..BCE + K2 /\ FL 370. J58, SPS + K4> BOIDS4-5	12345	7912
T	IP	R	KSFO	K2	P	KDFW	K4	P	01021	BCE	002	PS (RW17B) "KIAH + K4" *	12346	7912
												(ROUTE FOR ALTERNATE AIRPORT ABOVE)		
T	IP	R	KDFW	K4	P	KIAH	K4	P	02031	BILEE	001	/USA/.. DFW + K4. J87, BILEE + K4> CUGAR 2 – BILEE (ALL)*	12860	8003
												(SID AND TRANS. NO STAR)		
T	IP	R	KSFO	K2	P	CYYC	CY	P	C34B	RBL	001	<SCD 3 – RBL (RW01B), RBL + K2 /\ FL 350/USA/. J1, SEA + K1. J505, ONSET + K1/CAN/. HL505, YYC + CY*	13245	7912
												(NO SID (VECTOR) AND TRANS. NO STAR. ENDS AT NAVAID)		
T	IP	R	KPHX	K2		MZB	K2	D	CS1	GBN	001	<MOBIE 3 – GBN (RW26B), GBN + K2/USA/. J2, MCB + K2/\ FL 350*	14235	7912
												(GREAT CIRCLE ROUTE WITH SID AND STAR)		
T	IP	R	KSFO	K2	P	KMIA	K7	P	GC1		001	<PORTE 2 – FAT (ALL), FAT + K2/USA/... 01 HEC + K2 /\ FL 390 ... 05BEC + K2... 44PHX + K2 ... 31N55 + K2 ... LVS	15234	7912
T	IP	R	KSFO	K2	P	KMIA	K7	P	GC1		002	84 + K2 .. AMA + K4 ... SPS85 + K4 ... SLR78 + K4 ... LCH 52 + K4 ... LEV42 + K7 ... 30CEW + K7 .. SRQ + K7 LEILA1 –	15235	7912
T	IP	R	KSFO	K2	P	KMIA	K7	P	GC1		003	SRQ*	15236	7912
												(RNAV WITH NO SID OR STAR. ENDS AT A WAYPOINT)		
T	IP	R	KDEN	K2	P	BEBOP	K2	E	AIR	J802R	001	/USA/... BLAND + K2 . J802R, OAL + K2 /\ FL 350. J964R, BEBOP + K2*	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 (R) EXAMPLE

OBSOLETE
DO NOT USE

ATTACHMENT 5 (cont)

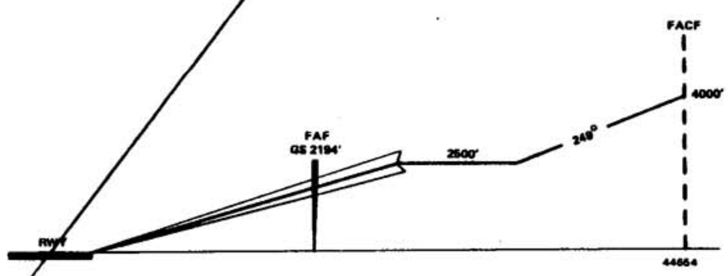
PATH AND TERMINATOR

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

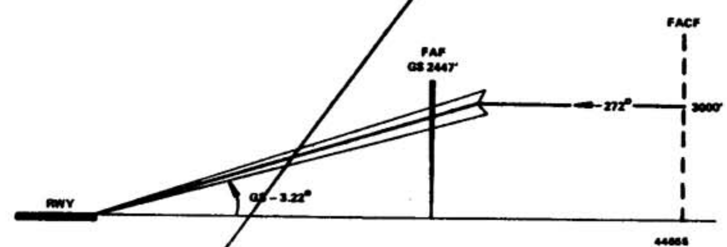
ATTACHMENT 5 (cont)

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

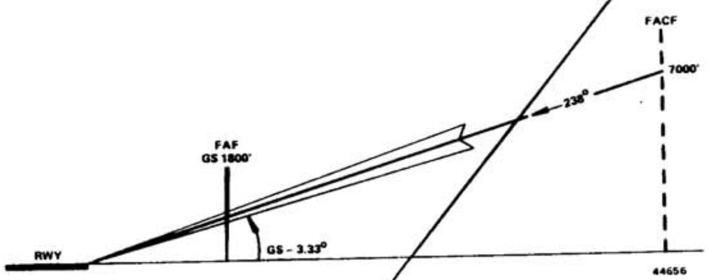
The Type C descent is illustrated in Figure 3. In this case the FACF is the first point on a constant descent path. The approach is coded with the FACF crossing altitude of AT 7000' in ALT 1 and 7000' in ALT 2 with an "I" in the ALT DESC field. The FAF record will contain the GS altitude at the FAF (1800') 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

ATTACHMENT 5 (cont)

PATH AND TERMINATOR

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.)

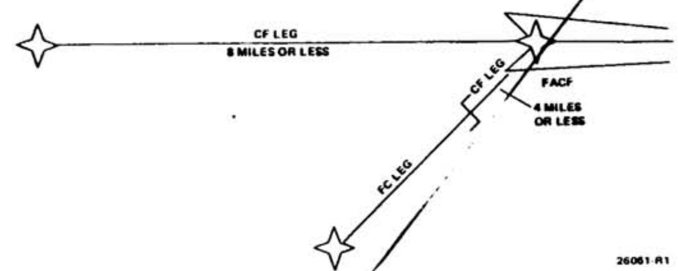
   c. The approach course intercept angle will be 30° or less.

OBSOLETE
DO NOT USE

ATTACHMENT 5 (cont)

PATH AND TERMINATOR

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

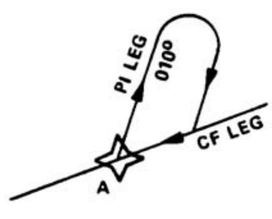
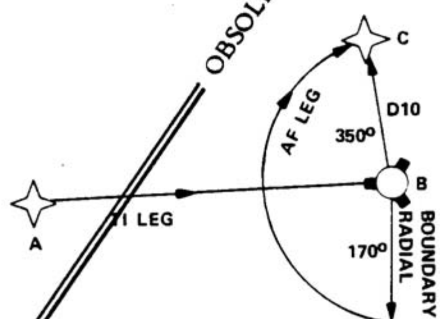
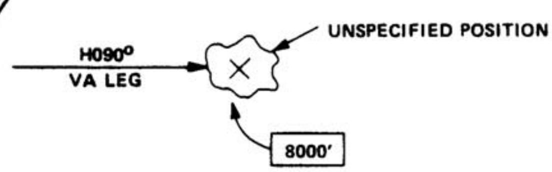
1. Missed approaches will be coded as part of each approach. The first missed approach record will contain an "M" in column 42 of the DESC CODE field.

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

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)

39624 (3) R1

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 (6th 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 (6th 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	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

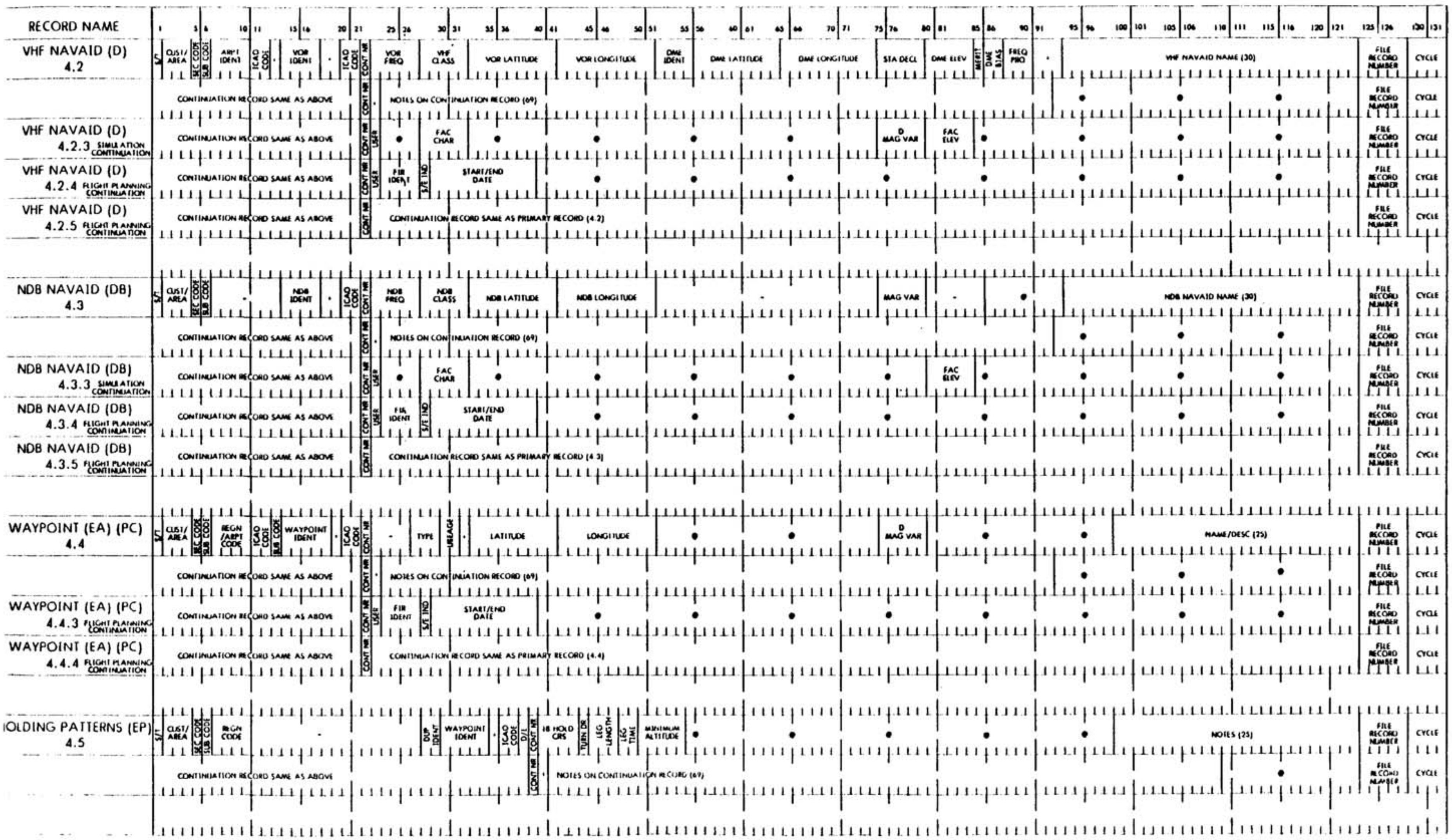
For Localizer based Approach Transitions ending in an intercept of the localizer or course to Final Approach Course Fix and the Final Approach path, the Recommended VHF NAVAID must be the referenced Localizer. For VOR Approach the final approach path must be the referenced VOR.

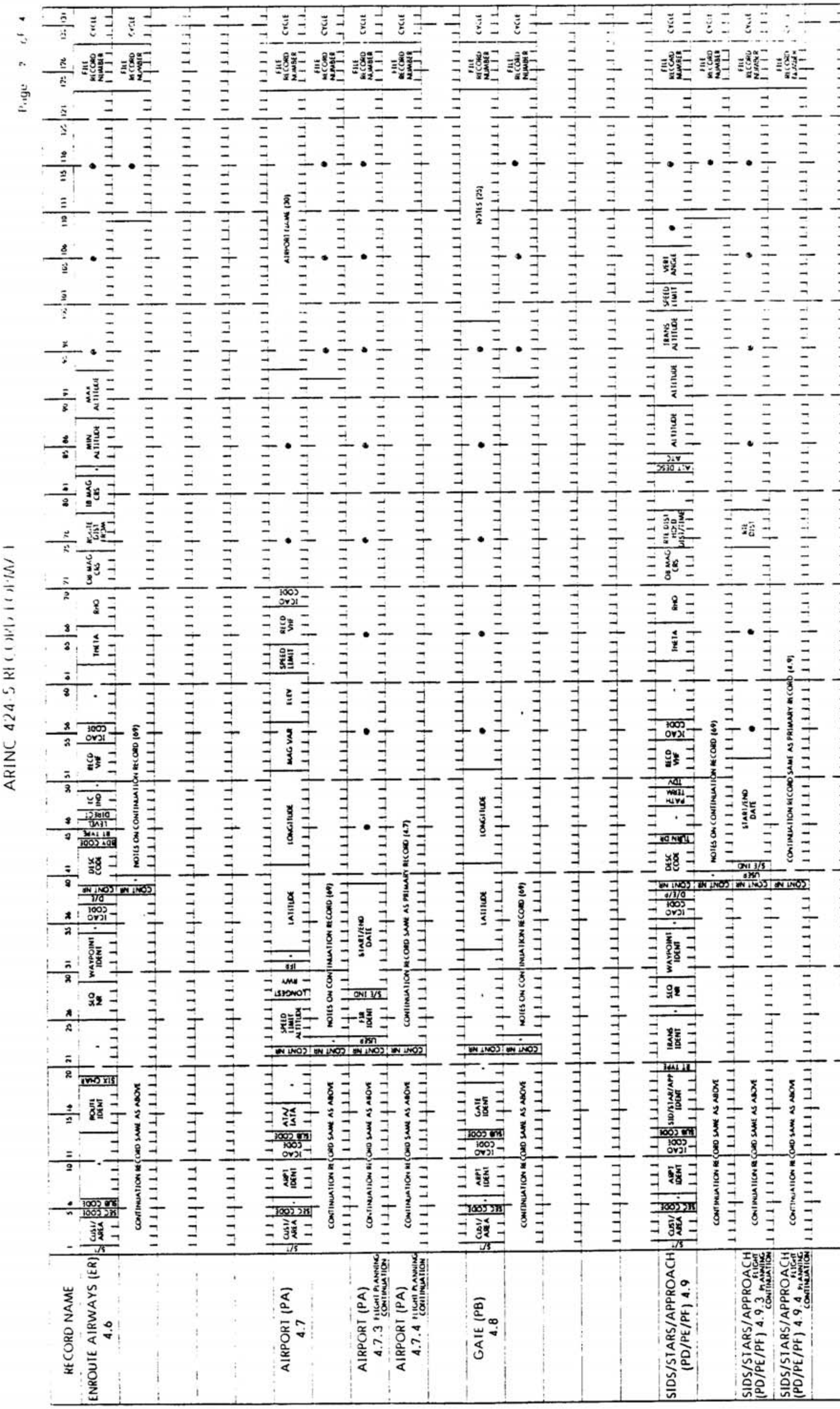
5.30 Altitude (ALTITUDE)

Expand title and text (new paragraph) to include minimum altitude. Delete reference to Attachment 4.

ARINC 424-5 RECORD FORMAT

Page 1 of 4




ARINC 424-5 RECORD FORMAT
RECORD NAME
ENROUTE AIRWAYS (ER) 4.6
AIRPORT (PA) 4.7
AIRPORT (PA) 4.7.3 FLIGHT PLANNING CONTINUATION
AIRPORT (PA) 4.7.4 FLIGHT PLANNING CONTINUATION
GATE (PB) 4.8
SIDS/STARS/APPROACH (PD/PE/PF) 4.9
SIDS/STARS/APPROACH (PD/PE/PF) 4.9.3 FLIGHT PLANNING CONTINUATION
SIDS/STARS/APPROACH (PD/PE/PF) 4.9.4 FLIGHT PLANNING CONTINUATION

ARINC 424 5 RECORD FORMAT

Column positions: 1, 5 | 6, 10 | 11, 15 | 16, 20 | 21, 25 | 26, 30 | 31, 35 | 36, 40 | 41, 45 | 46, 50 | 51, 55 | 56, 60 | 61, 65 | 66, 70 | 71, 75 | 76, 80 | 81, 85 | 86, 90 | 91, 95 | 96, 100 | 101, 105 | 106, 110 | 111, 115 | 116, 120 | 121, 125 | 126, 130 | 131

RECORD NAME	Fields
RUNWAY (PG) 4.10	S/T · CUST/AREA · SEC CODE · • · ARPT IDENT · ICAO CODE · SUB CODE · RUNWAY IDENT · • · CONT NR · RUNWAY LENGTH · RUNWAY BEARING · • · LATITUDE · LONGITUDE · • · LDG THRES ELEV · DSPLCD THR · TCH · WIDTH · • · LOC IDENT · • · STOPWAY · • · RUNWAY DESCRIPTION (22) · FILE RECORD NUMBER · CYCLE
	CONTINUATION RECORD SAME AS ABOVE · CONT NR · • · NOTES ON CONTINUATION RECORD (69) · • · • · • · FILE RECORD NUMBER · CYCLE
RUNWAY (PG) 4.10.3 SIMULATION CONTINUATION	CONT NR · USER · • · • · • · TRUE BEARING · SOURCE · • · LOCATION · TDZ ELEV · • · • · • · • · • · FILE RECORD NUMBER · CYCLE
ILS (LOCALIZER & G.S.) (PI) 4.11	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 (FT) · @/-/+ · G.S. FR RW END (FT) · LOC WIDTH · G.S. ANGLE · STA DEC · TCH · G.S. ELEV · • · • · FILE RECORD NUMBER · CYCLE
	CONTINUATION RECORD SAME AS ABOVE · CONT NR · • · NOTES ON CONTINUATION RECORD (69) · • · • · • · FILE RECORD NUMBER · CYCLE
ILS (LOCALIZER & G.S.) (PI) 4.11.3 SIMULATION CONTINUATION	CONT NR · USER · • · FAC CHAR · • · • · TRUE BEARING · SOURCE · • · • · • · G.S. BEAM WIDTH · • · • · • · FILE RECORD NUMBER · CYCLE
COMPANY ROUTE (R) 4.12	S/T · CUST/AREA · SEC CODE · SUB CODE · FROM ARPT/FIX · • · ICAO · D/E/P · SUB CODE · TO ARPT/FIX · • · ICAO · D/E/P · SUB CODE · COMPANY ROUTE ID · SEQ NO. · VIA · S/S/A AWY · AREA · TO FIX · ICAO · D/E/P · SUB CODE · RUNWAY TRANS · ENRT TRANS · • · CRUISE ALTITUDE · TERM/ALT ARPT · ICAO · ALT DIST · COST INDEX · ENRT ALT ARPT · • · • · • · FILE RECORD NUMBER · CYCLE
ILS MARKERS (PM) 4.13	S/T · CUST/AREA · SEC CODE · ARPT IDENT · ICAO CODE · SUB CODE · LOC IDENT · MKR TYPE · • · CONT NR · FREQ · RUNWAY IDENT · MKR LATITUDE · MKR LONGITUDE · MINOR AXIS TRUE · LOCATOR LATITUDE · LOCATOR LONGITUDE · CLASS · FAC CHAR · LOC IDENT · • · MAG VAR · • · FAC ELEV · • · • · FILE RECORD NUMBER · CYCLE
AIRPORT COMM (PV) 4.14	S/T · CUST/AREA · SEC CODE · ARPT IDENT · ICAO CODE · SUB CODE · COMM TYPE · ADDL SERVICE · RADAR · • · CONT NR · FREQ · MODULAT · • · LATITUDE · LONGITUDE · MAG VAR · ELEV · COMM FREQ · MODULAT · COMM FREQ · MODULAT · COMM FREQ · MODULAT · COMM FREQ · MODULAT · COMM FREQ · MODULAT · COMM FREQ · MODULAT · COMM FREQ · MODULAT · FILE RECORD NUMBER · CYCLE
	CONTINUATION RECORD SAME AS ABOVE · CONT NR · USER · CALL SIGN (30) · • · • · • · • · • · • · • · FILE RECORD NUMBER · CYCLE
	CONTINUATION RECORD SAME AS ABOVE · CONT NR · USER · COMM FREQ · MODULAT · COMM FREQ · MODULAT · COMM FREQ · MODULAT · COMM FREQ · MODULAT · COMM FREQ · MODULAT · COMM FREQ · MODULAT · COMM FREQ · MODULAT · COMM FREQ · MODULAT · COMM FREQ · MODULAT · COMM FREQ · MODULAT · COMM FREQ · MODULAT · COMM FREQ · MODULAT · • · FILE RECORD NUMBER · CYCLE

ARINC 424-5 RECORD FORMAT

Columns: 1, 5, 6, 10, 11, 15, 16, 20, 21, 25, 26, 30, 31, 35, 36, 40, 41, 45, 46, 50, 51, 55, 56, 60, 61, 65, 66, 70, 71, 75, 76, 80, 81, 85, 86, 90, 91, 95, 96, 100, 101, 105, 106, 110, 111, 115, 116, 120, 121, 125, 126, 130, 131

RECORD NAME	Fields (in column 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 · CRSE 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 · RUA · 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 RECORD SAME AS ABOVE · CONT NR · TIME CD · NOTAM · TIME IND · S/E 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 · D/E/P · 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 NAVAID Class (CLASS)

VHF NAVAID Table is expanded to include ILS/TACAN installations. Note 4 is added.

ORIGINAL TEXT FOLLOWS

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
Low Altitude			L		Note
High Altitude			H		1
Unrestricted (see Note 3)			U		

5.39 Magnetic Variation

Delete "Airport Magnetic Variation" from Terminal Waypoint record.

5.54 Longest Runway (LONGEST RWY)

Table deleted. Runway field entry was changed from alpha characters to numerical length in Supplement 5.

ORIGINAL TEXT FOLLOWS

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 Direction Restriction

New text encompasses use of direction restriction for airway restriction records.

ORIGINAL TEXT FOLLOWS

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 Boundary Via (BDRY VIA)

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 Arc Distance (ARC DIST)

Add "C" to the Arc Distance field content list in Source Content paragraph.

5.121 Lower/Upper Limit

Delete "control airspace" from Definition/Description paragraph.

5.127 Maximum Altitude (MAX ALT)

Definition/Description: The "Maximum Altitude" field is used to indicate the maximum altitude allowed.

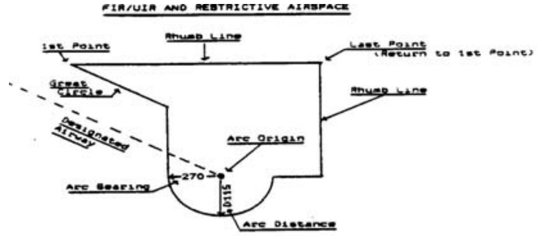
Source/Content: Maximum altitudes should be derived from official government publications describing the upper limit of the airway in feet or flight level.

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.

ORIGINAL TEXT FOLLOWS



Boundary Via	Latitude	Longitude	Arc Origin Latitude	Arc Origin Longitude	Arc Dist	Arc Brg
C	N45-00-00	W060-00-00				
H	N42-00-00	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				
HE	N45-00-00	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.

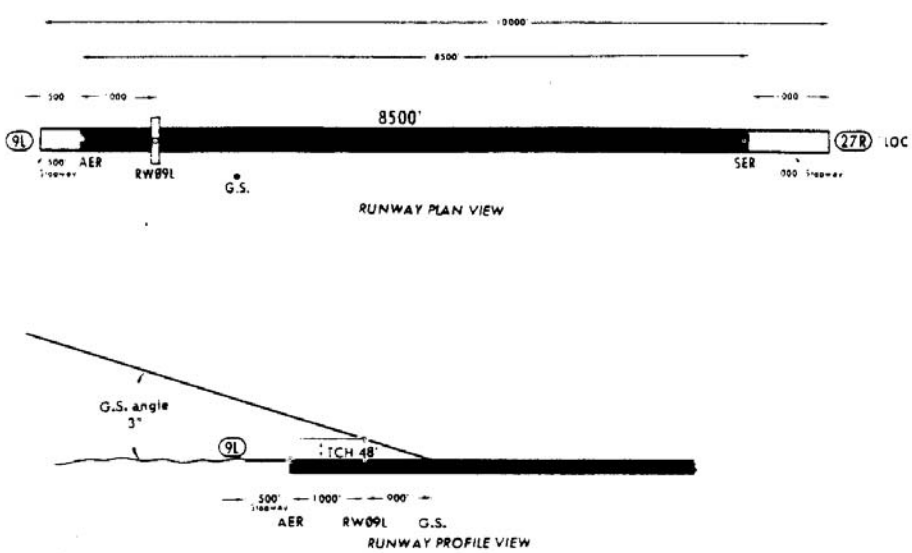
Source/Content: The Magnetic Tracks will be derived from official government sources in degrees and tenths of degree with the decimal point suppressed.

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"

RW89L 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 RW89L

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.

Existing copies of Specification 424-7 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 7.

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.

5.27.1 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 Controlled Airspace Primary Records

Was numbered 4.27.1 prior to 424-14.

4.1.25.2 Controlled Airspace Continuation Records

Was numbered 4.27.2 prior to 424-14 and the title was changed to "Controlled Airspace Continuation Records

4.1.26 Geographical Reference Table Records (TG)

Was numbered 4.28 prior to 424-14.

4.1.26.1 Geographical Reference Table Primary Records

Was numbered 4.28.1 prior to 424-14 and the title was changed to "Geographical Reference Table Primary Records."

4.1.27 Flight Planning Arrival/Departure Data Record (PR)

This section was added.

4.1.27 Flight Planning Arrival / Departure Data

This section was added.

4.1.27.1 Primary Record

This section was added.

4.1.27.2 Continuation Records

This section was added.

4.1.27.3 Continuation Records

This section was added.

4.1.28 Path Point Records (PP)

This section was added.

4.1.29 GLS Record (PT)

This section was added.

4.1.29.1 Primary Records

This section was added.

4.1.30 Alternate Record (RA)

This section was added.

4.1.30.1 Primary Record

This section was added.

4.2 Master Helicopter User file (HA)

This section was added.

4.2.1 Heliport Records

Was numbered 4.24 prior to 424.14

4.2.1.1 Heliport Primary Records

Was numbered 4.24.1 prior to 424-14 and the title was changed to "Heliport Primary Records."

4.2.1.2 Heliport Continuation Records

Was numbered 4.24.2 prior to 424-14 and the title was changed to "Heliport Continuation Records."

4.2.1.3 Heliport Flight Planning Continuation Records

Was numbered 4.24.3 prior to 424-14 and the title was changed to "Heliport Flight Planning Continuation Records."

4.2.1.4 Heliport Flight Planning Continuation Records

Was numbered 4.24.4 prior to 424-14 and the title was changed to "Heliport Flight Planning Continuation Records."

The Following Sections Have Been Added To Support Rotor-Wing Records:

4.2.2 Heliport Terminal Waypoint Record (HC)

4.2.2.1 Primary Records

4.2.2.2 Continuation Records

4.2.2.3 Flight Planning Continuation Records

4.2.2.4 Flight Planning Continuation Records

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

4.2.3.1 Heliport SID/STAR/Approach Primary Records

4.2.3.2 Heliport SID/STAR/Approach Continuation Records

4.2.3.3 Heliport SID/STAR/Approach Flight Planning Continuation Records

4.2.3.4 Heliport SID/STAR/Approach Flight Planning Continuation Records

4.2.4 Heliport MSA (HS)

4.2.4.1 Primary Records

4.2.4.2 Continuation Records

4.2.5 Heliport Communications Records (HV)

Was numbered 4.26 prior to 424-14.

4.2.5.1 Heliport Communications Primary Records

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.

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SUPPLEMENT 16

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: August 30, 2002

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: April 8, 2002

A. PURPOSE OF THIS SUPPLEMENT

This supplement introduces revisions and additions to the body and Attachments of ARINC Specification 424. These changes improve the operational utility of the navigation data base

B. ORGANIZATION OF THIS DOCUMENT

This document, printed on goldenrod paper, contains descriptions of changes introduced into ARINC Specification 424 by this supplement. The material in Supplement 16 is integrated into ARINC Specification 424 to form an updated version of the standard.

Historically, the changes introduced by each supplement are annotated by using a change bar and labeling in the margin with a symbol associated with the supplement number. In preparing this supplement for the latest adoption, Supplement 16, the practicality of identifying all past changes in this manner was determined to be impractical.

Therefore, this supplement will only indicate the latest changes by use of change bars without numeration.

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.

1.2 Data Format Standardization Philosophy

The second paragraph was revised for clarity.

2.2 Special Navigation Terms

Editorial corrections were made with no change of intent.

2.3 Precision RNAV Terms

The Landing Threshold Point/Fictitious Threshold Point (LTP/FTP), Flight Path Control Point, Flight Path Alignment Point, Glide Path Angle, and Final Approach Segment (FAS) CRC were revised to support the Path Point concept for precision GNSS Approach Procedures.

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

The section was revised to include VFR Waypoints.

3.2.4.3 Airport Terminal Waypoints Section (P) Subsection (C)

The section was revised to include VFR Waypoints excluding the landing threshold as a fix (waypoint).

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

Section title was revised.

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

Section title was revised.

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

The section was revised to include VFR Waypoints.

4.1.2.1 VHF NAVAID Primary Records

DME Longitude was revised to columns 65 thru 74.

4.1.4 Waypoint Record (EA) or (PC)

The section was revised to include VFR Waypoints.

4.1.4.1 Waypoint Primary Records

Section title was revised.

4.1.5.1 Holding Pattern Primary Records

The RNP and ARC radius fields were added (column 63 thru 71).

The Notes field (columns 99 thru 123) was changed to Name.

4.1.6.1 Enroute Airways Primary Records

Columns 99 thru 101 were revised to Fixed Radius Transitions Indicator. Section 5.254 was added to support Fixed Radius Transition Indicators in the ER Airway file.

4.1.8.1 Airport Gate Primary Record

The Notes field was changed to Name, Section 5.60.

4.1.9.3 Airport SID/STAR/Approach Flight Planning Continuation Records

Columns 75 thru 78 was revised to Leg Distance Section 5.260.

4.1.12.1 Company Route Primary Records

Section title was revised.

4.1.20.1 Airport MSA

Multiple radius fields were added to this record.

4.1.21.1 Enroute Airways Restriction Altitude Exclusion Primary Records

Column 123 was changed from blank to Block Indicator.

Section title was revised.

4.1.21.2 Altitude Exclusion Continuation Records

Column 123 was changed from blank to Block Indicator.

Section title was revised.

4.1.21A.1 Enroute Airways Restriction Note Restriction Primary Records

Section title was revised.

4.1.21A.2 Enroute Airways Restriction Note Restriction Continuation Records

Section title was revised.

4.1.21B.1 Enroute Airways Restriction Seasonal Closure Primary Records

Section title was revised.

4.1.21C.1 Enroute Airways Restriction Cruising Table Replacement Primary Records

Section title was revised.

4.1.21C.2 Enroute Airways Restriction Cruising Table Replacement Continuation Records

Section title was revised.

4.1.27.1 Flight Planning Primary Record

Section title was revised.

4.1.27.2 Flight Planning Continuation Records

Section title was revised

4.1.27.3 Flight Planning Continuation Records

Section title was revised.

4.1.28.1 Path Point Primary Record

The Path Point Record was revised from columns 27 through 115 to support the Path Point concept for precision GNSS Approach Procedures.

The Note was revised to remove obsolete text and to support the Path Point Record description.

4.1.29.1 GLS Primary Records

Section title was revised.

4.1.30.1 Alternate Primary Records

Section title was revised.

4.2.2 Heliport Terminal Waypoint Records(HC)

The section was revised to include VFR Waypoints.

4.2.2.1 Heliport Terminal Waypoint Primary Records

Section title was revised.

4.2.2.2 Heliport Terminal Waypoint Continuation Records

Section title was revised.

4.2.2.3 Heliport Terminal Waypoint Flight Planning Continuation Records

Section title was revised.

4.2.2.4 Heliport Terminal Waypoint Flight Planning Continuation Records

Section title was revised.

4.2.4.1 Heliport MSA Primary Records

Multiple radius fields were added to this record.

Section title was revised.

4.2.4.2 Heliport MSA Continuation Records

Section title was revised.

5.7 Route Type (RT TYPE)

Deleted the Note 2 from Route Type "J."

Deleted Route Type E.

The Qualifier columns were separated from the Route Type Description into a separate table to aid in clarity.

Added Qualifiers Field 1 codes E, F, G, J, R, and V.

Added Qualifiers Field 2 codes A, B, and E.

Primary and Secondary Missed Approach codes were changed form Qualifier 1 P and S to Qualifier 2 A and B respectively.

Note 1 was revised for clarity.

Note 6 was added.

The Approach examples were revised.

5.10 Approach Route Identifier

Converted the text information into a table to make the information more readable.

5.17 Waypoint Description Code (DESC CODE)

Note 6 was revised for clarification, no change of intent.

5.18 Boundary Code (BDY CODE)

The asterisk Note was added to refer to Figure 5-2.

5.23 Recommended NAVAID (RECD NAV)

The Procedure Use Figure, 5-7 was updated to be consistent with Attachment 5, Leg Data Fields.

5.29 Altitude Description (ALT DESC)

Modified to allow coding of both minimum and VNAV path altitudes from government source or as calculated by the data supplier.

Note was added for Field Content V.

5.30 Altitude/Minimum Altitude

The third paragraph of the Definition/Description was modified to reflect the revised Altitude Description Code V.

5.35 NAVAID Class (CLASS)

The Navaid Class tables were revised for clarity. Notes 6 and 7 were deleted as they clarified in the table.

Code “U” was changed to Undefined from Unrestricted.

5.42 Waypoint Type (TYPE)

VFR Waypoint was added to both the Enroute and Terminal Waypoint tables.

Note 4 was added to support VFR Waypoints.

5.60 Name (NAME)

The section title and text were revised to more accurately reflect the implementation of the record.

5.70 Vertical Angle (VERT ANGLE)

The text was modified to allow indicating published VNAV Angle where appropriate.

5.80 ILS/MLS/GLS Category

Section title was revised to include GLS

5.82 Waypoint Usage

The term Airway was removed from the text and table.

5.101 Communications Type (COMM TYPE)

Enroute Comm Only (EFS) and Ground Comm Outlet (GCO) were added as communication types.

5.103 Communication Frequency (COMM FREQ)

The text was modified to explain that it contains either a frequency or channel to support 8.33 kHz VHF Communication.

5.104 Frequency Units (FREQ UNIT)

Text was added to include a code that indicates “channel” rather than frequency.

5.106 Service Indicator (SERV IND)

The service one indicator of “E” for EFAS was deleted.

5.114 Duplicate Indicator (DUP IND)

New Duplicate Code of 8 was added for “All Altitudes” under multiple holding patterns.

5.118 Boundary Via (BDRY VIA)

The “arc by edge” option was deleted.

5.144 Center Fix (CENTER FIX)

The Source/Content paragraph was revised to support Airport Reference Point for MSA Center Fix.

5.146 Sector Bearing (SEC BRG)

This section was revised to support beginning and ending bearing as well as multiple radii fields.

5.180 Pad Identifier (PAD IDENT)

The character length was changed to 5 characters max.

5.200 Remote Facility (REM FAC)

The text was revised to support that Remote Facility could be a navaid through which the Communication Service is transmitted, using the navaid frequency, or the Remote could be an airport that the Communication Service is transmitted from on unique frequencies.

5.204 ARC Radius (ARC RAD)

The definition/description paragraph and Used On paragraph were revised to support holding patterns for RNP Holding.

5.211 Required Navigation Performance (RNP)

The entire section was revised to support RNP and examples were added to Attachments 4 and 5 to support RNP.

5.223 Operation Types (OPS TYPE)

This section was revised to support the Path Point concept for precision GNSS Approach Procedures.

5.224 Route Indicator (RTE IND)

The title and text was revised to support the Path Point concept for precision GNSS Approach Procedures.

5.225 Ellipsoid Height

The text was revised to remove the reference to feet as the path point concept is only in meters.

5.226 Glide Path Angle (GPA)

Text referring to the illustration on Precision Approach Path Points was added.

Figure 5-15 on Precision Approach Path Points was added by this Supplement.

5.227 Orthometric Height (ORTH HGT)

The text was revised to remove the reference to feet as the path point concept is only in meters.

5.228 Course Width at Threshold (CRS WDTH)

The title and text was revised to support the Path Point concept for precision GNSS Approach Procedures.

5.229 Final Approach Segment data CRC Remainder (FAS CRC)

The title and text was revised to support the Path Point concept for precision GNSS Approach Procedures.

5.254 Fixed Radius Transitions Indicator (FIXED RAD IND)

This Section 5.254 was added to support constant Fixed Radius Transition Indicators in the ER Airway file.

5.255 SBAS Service Provider Identifier (SBAS ID)

This section was added to support the Path Point concept for precision GNSS Approach Procedures.

5.256 Reference Path Data Selector (REF PDS)

This section was added to support the Path Point concept for precision GNSS Approach Procedures.

5.257 Reference Path Identifier (REF ID)

This section was added to support the Path Point concept for precision GNSS Approach Procedures.

5.258 Approach Performance Designator (APD)

This section was added to support the Path Point concept for precision GNSS Approach Procedures.

5.259 Length Offset (OFFSET)

This section was added to support the Path Point concept for precision GNSS Approach Procedures.

5.260 Terminal Procedure Flight Planning Leg Distance (LEG DIST)

This section was added to define the segment distance along the track.

6.7 Labels

The label format was updated to 132 bit character format.

6.7.1 Volume Header Label (VOL)

The label format was updated to 132 bit character format.

6.7.2 Header 1 Label (HDR 1)

The label format was updated to 132 bit character format.

6.7.3 Header 2 Label (HDR 2)

The label format was updated to 132 bit character format.

6.7.4 End-of-File Trailer Label (EOF)

The label format was updated to 132 bit character format.

6.7.5 End-of-Volume Trailer Label (EOV)

The label format was updated to 132 bit character format.

6.10.2 Generator Polynomials

The CRC–32Q polynomial was revised to correlate with Section 6.11.3.

7.3.6 VFR Waypoints

This section was added to support the inclusion of VFR Waypoints.

ATTACHMENT 2 LOCAL HORIZONTAL REFERENCE DATUM NAME, DATUM CODE, AND ELLIPSOID LIST

The Local Horizontal Reference Datum code and Ellipsoid list was updated.

ATTACHMENT 4 AIRWAY MINIMUM ALTITUDE AND REQUIRED NAVIGATION PERFORMANCE (RNP)

Coding Examples for RNP were added.

ATTACHMENT 5 PATH AND TERMINATOR

Introductory Section

A commentary was added for XA legs.

1. The title was changed to Distance to Calculation from Speed.

2. The definition of Bank Angle was revised to state the ground speed of 250 knots.

4. The title was changed to Outbound Leg from Teardrop Procedures.

5. The Intercept Angle, items “A” and “C” were revised to support approach transitions to intercept the localizer approach path.

1.2 Beginning and Ending Leg Types

A “TF” leg was added to the Beginning Leg column for Missed Approach.

A “IF” leg was added to the Beginning Leg column for SID Runway Transition and SID with a note that it be proceeded by the runway as an “IF.”

RF path terminators were added to each Ending Leg column accept Approach Transition.

The Note, “When Approach Transition is for GPS Approach Procedure” was deleted.

1.3 Leg Sequencing

An ampersand was added to the square for “TF/DF” and the corresponding Note was revised to include an “TF/DF” sequence.

The # symbol and the corresponding Note were deleted.

2.0 Coding Rules Applicable to All Procedures

Rule 2.9 was added to support RNP.

5.0 Standard Terminal Arrival Route(STAR) Coding Rules

The following text replaced wording after Approach Transition in Rule 5.7 line 2:

"both the Arrival Route and the Approach Transition will be coded in their entirety in accordance with source documentation."

6.0 Approach Procedure Rules Valid For All Procedure Types

Rule 6.2.1 was revised in correlation with Section 5.29.

Rule 6.2.5 the text was added by this Supplement. Rule 6.2.5.2 was previously Rule 6.2.5.

Rule 6.2.5.1 was added by this Supplement.

Rule 6.2.5.2 was previously Rule 6.2.5 before Rule 6.2.5.1 and 6.2.5.2 were added.

Rule 6.2.5.3 was added to support VNAV coding of approach procedures where the MAP is not at the LTP.

The following text was deleted from Rule 6.2.9.3:

"in cases where the final approach course was designed to cross over the runway threshold."

The following clause was deleted from Rule 6.2.9.4:

"or the published Missed Approach Point is abeam the runway threshold."

Rule 6.2.10.1 was revised in correlation with Section 5.29.

The first sentence of Rule 6.2.10.2.d was revised for clarification.

Rule 6.2.10.3 was revised in correlation with Section 5.29.

Rule 6.3.4.was deleted by Supplement 16.

Rule 6.3.6.4, the following text was added: "angles between 10 and 90 degrees may be coded as required."

Rule 6.6.3.2 was revised to recommend the VORDME RNAV approaches will be the procedure VORDME

7.0 Precision Approach Coding

The following sentence was added to Rule 7.1.7:

"If the altitude 1 and 2 constraints for the FAF are "at" (G) and equal to the FACF altitude with an altitude description of "I", the vertical angel is omitted from the FAF record."

Rule 7.1.8, the Notes were revised for clarity, no change of intent.

8.0 Non-Precision Approach Procedure Coding

Rule 8.1.1 was revised in correlation with Section 5.29.

The first sentence of Rule 8.3.2 was revised for clarification.

Rule 8.3.5.3 the first sentence was revised as follows:

"The recommended navaid is not required unless specified by the state, or if required by leg type. The recommended navaid, must be prior procedure reference VORDME or VORTAC."

The first sentence of rule 8.6 was revised as follows:

"Procedures which are Circle-To-Land may be included in the data base."

Rule 8.6.4 was revised to include the Final End Point.

9.0 Missed Approach Procedures Rules Valid For All Procedures Types

Rule 9.3.1.4 "if not specified by source" was added to end of the first sentence.

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SUPPLEMENT 17

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: August 31, 2004

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: May 5, 2004

A. PURPOSE OF THIS SUPPLEMENT

This Supplement introduces revisions and additions to the body and Attachments of ARINC Specification 424. These changes remove obsolete text, allow using Airport Records as the "TO FIX" in Enroute Airways and improve the operational utility of the navigation data base for RNP Procedures.

B. ORGANIZATION OF THIS DOCUMENT

This document, printed on goldenrod paper, contains descriptions of changes introduced into ARINC Specification 424 by this Supplement. The material in Supplement 17 is integrated into ARINC Specification 424 to form an updated version of the standard.

The changes introduced by Supplement 17 have been identified using change bars.

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.

1.1 Purpose of this Document

The obsolete terms Tapes and Cassettes were removed and new text was added.

A statement was included that ARINC 424 is to be an enabling document and enables database suppliers, avionics systems, and other users of the databases to flight plan and fly procedures as prescribed by procedure designers.

1.2 Data Format Standardization Philosophy

The obsolete terms Tapes and Cassettes were removed and revised text was added.

The first Commentary on clarifying the term Cassette was deleted.

1.3 Organization of the Document

The obsolete terms Tapes and Cassettes were removed and revised text was added.

1.3.1 Coverage of Helicopter Operation Needs

Editorial corrections were made.

Figure 1-1 ARINC Specification 424 Information Presentation

The obsolete terms Tapes and Cassettes were removed and revised text was added.

2.1 Data Processing Terms

The term Alpha was revised to describe any letter of the alphabet (A through Z); any punctuation; or any printable character, other than a numeric, including space.

The term Cassette was deleted.

2.2 Special Navigation Terms

The Mandatory Hold definition was added.

3.1 User File Organization

The obsolete terms Tapes and Cassettes were removed and revised text was added.

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

This section was updated to specifically allow using Airport Records as the "TO FIX" in Enroute Airways.

3.2.4.17 Airport Terminal Arrival Altitude Section (P), Subsection (K)

New section added to support Terminal Arrival Altitudes.

3.3.10 Heliport Terminal Arrival Area Section (H), Subsection (K)

New section added to support Terminal Arrival Altitudes.

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

The Figure title was revised to remove the outdated term tape.

4.1.2.2 VHF NAVAID Continuation Records

Application Type field was added and the Application Note was deleted.

4.1.2.5 VHF NAVAID Flight Planning Continuation Records

A Note was added explaining that Flight Planning continuation records cannot have an Application Type column.

4.1.2.6 VHF NAVAID Limitation Continuation Record

The Application Type field was added.

4.1.3.2 NDB NAVAID Continuation Records

Application Type field was added and the Application Note was deleted.

4.1.3.5 NDB NAVAID Flight Planning Continuation Records

A Note was added explaining that Flight Planning continuation records cannot have an Application Type column.

4.1.4.2 Waypoint Continuation Records

Application Type field was added and the Application Note was deleted.

4.1.4.4 Waypoint Flight Planning Continuation Records

A Note was added explaining that Flight Planning continuation records cannot have an Application Type column.

4.1.5.2 Holding Pattern Continuation Records

Application Type field was added and the Application Note was deleted.

4.1.6.2 Enroute Airways Continuation Records

Application Type field was added and the Application Note was deleted.

4.1.6.4 Enroute Airways Flight Planning Continuation Records

A Note was added explaining that Flight Planning continuation records cannot have an Application Type column.

4.1.7 Airport Records (PA)

This section was updated to specifically allow using Airport Records as the "TO FIX" in Enroute Airways.

4.1.7.2 Airport Continuation Records

Application Type field was added and the Application Note was deleted.

4.1.7.4 Airport Flight Planning Continuation Records

A Note was added explaining that Flight Planning continuation records cannot have an Application Type column.

4.1.8.2 Airport Gate Continuation Records

Application Type field was added and the Application Note was deleted.

4.1.9.1 Airport SID/STAR/Approach Primary Record

Speed Limit Description field was added, column 118.

A TAA Procedure Turn and TAA Sector identifier field was added.

Note 3 was added to support columns 107-116.

4.1.9.2 Airport SID/STAR/Approach Continuation Records

The Application Type field was added and the record was modified to incorporate the procedure TCH and the Altitude three requirements.

Note 1 was deleted on Application Type.

4.1.9.4 Airport SID/STAR Flight Planning Continuation Records

A Note was added explaining that Flight Planning continuation records cannot have an Application Type column.

4.1.10.1 Runway Primary Records

TCH Value Indicated filed was added to support Altitude description in ILS coding.

4.1.10.2 Runway Continuation Records

Application Type field was added and the Application Note was deleted.

4.1.11.1 Airport and Heliport Localizer and Glide Slope

A set of supporting facilities to contain Section, Subsection ID, and ICAO identifier to support MLS DME was added.

4.1.11.2 Airport and Heliport Localizer and Glide Slope Continuation Records

Application Type field was added and the Application Note was deleted.

4.1.13.2 Airport and Heliport Localizer Continuation Records

The Continuation Records was added to be consistent with the philosophy of addressing a new industry standard for providing primary data beyond the 132 character Primary record.

4.1.14.2 Airport Communications Continuation Records

The Application Type field was added.

4.1.14.3 Airport Additional Continuation Records

The Application Type field was added.

4.1.15.2 Airways Marker Continuation Records

The Continuation Records was added to be consistent with the philosophy of addressing a new industry standard for providing primary data beyond the 132 character Primary record.

4.1.17.2 FIR/UIR Continuation Records

The Continuation Records was added to be consistent with the philosophy of addressing a new industry standard for providing primary data beyond the 132 character Primary record.

4.1.18.2 Restrictive Airspace Continuation Record

The Application Type field was added.

4.1.18.3 Restrictive Airspace Flight Planning Continuation Record

The Application Type field was added.

4.1.20.2 Airport MSA Continuation Records

The Application Type field was added.

4.1.22.1 Airport and Heliport MLS Primary Records

A set of supporting facilities to contain Section, Subsection ID, and ICAO identifier to support MLS DME was added.

4.1.21.2 Enroute Airways Restriction Altitude Exclusion Continuation Records

The Application Type field was added.

4.1.21A.2 Enroute Airways Restriction Note Restriction Continuation Records

The Application Type field was added.

4.1.21C.2 Enroute Airways Restriction Cruising Table Replacement Continuation Records

The Application Type field was added.

4.1.22.2 Airport and Heliport MLS Continuation Records

The Application Type field was added.

4.1.23.2 Enroute Communications Continuation Records

The Application Type field was added.

4.1.23.3 Enroute Communications Continuation Records

The Application Type field was added.

4.1.24.2 Preferred Route Continuation Records

The Application Type field was added.

4.1.24.3 Preferred Route Continuation Record (ET)

The Application Type field was added.

4.1.25.2 Controlled Airspace Continuation Records

The Application Type field was added.

4.1.26.2 Geographical Reference Table Continuation Records

The Continuation Records was added to be consistent with the philosophy of addressing a new industry standard for providing primary data beyond the 132 character Primary record.

4.1.27.1 Flight Planning Primary Records

Speed Limit Description field was added.

4.1.27.2 Flight Planning Continuation Records

The Application Type field was added.

4.1.28.1 Path Point Primary Record

The record was updated to be congruent with RTCA DO-229C.

4.1.28.2 Path Point Continuation Records

New section added by this supplement.

4.1.29.2 GLS Continuation Records

The Continuation Records was added to be consistent with the philosophy of addressing a new industry standard for providing primary data beyond the 132 character Primary record.

4.1.31 Airport TAA (PK)

New section added to support Terminal Arrival Altitudes.

4.1.31.1 Airport TAA Primary Records

New section added to support Terminal Arrival Altitudes.

4.1.31.2 Airport Terminal Arrival Area Continuation Records

New Section added to support Terminal Arrival Altitudes.

4.2.1.2 Heliport Continuation Records

The Application Type field was added.

4.2.1.4 Heliport Flight Planning Continuation Records

The Application Type field was added.

4.2.2.2 Heliport Terminal Waypoint Continuation Records

Application Type field was added and the Application Note was deleted.

4.2.3.1 Heliport SID/STAR/Approach Primary Records

Speed Limit Description field was added.

A TAA Procedure Turn and TAA Sector identifier field was added.

Note 2 added to support Columns 119-120.

Note 2 added to support Columns 107-116.

4.2.3.2 Heliport SID/STAR/Approach Continuation Records

Application Type field was added and the record was modified to incorporate the procedure TCH and the Altitude three requirements.

Note 1 was deleted on Application Type.

4.2.3.4 Heliport SID/STAR/Approach Flight Planning Continuation Records

A Note was added explaining that Flight Planning continuation records cannot have an Application Type column.

4.2.4.2 Heliport MSA Continuation Records

Application Type field was added and the Application Note was deleted.

4.2.5.2 Heliport Communications Continuation Records

Application Type field was added.

4.2.5.3 Heliport Communications Continuation Records

The Application Type field was added.

4.2.6.1 Heliport TAA Primary Records

New section added to support Terminal Arrival Altitudes.

4.2.6.2 Heliport Terminal Arrival Area Continuation Records

New section added to support Terminal Arrival Altitudes.

5.5 Subsection Code (SUB CODE)

This section was updated to support TAA.

5.6 Airport/Heliport Identifier (ARPT/HELI IDENT)

This section was updated to specifically allow using Airport Records as the "TO FIX" in Enroute Airways.

Text was added to support TAA.

5.7 Route Type (RT TYPE)

The "H" identifier of the Qualifier 2 Field and the supporting Note 5 were deleted.

The Airport Approach (PF) and Heliport Approach (HF) Records – Route Type table was revised to include the following new or revised Approach Route Types:

VORDME Approach
GNSS Landing System (GLS) Approach
Non-Directional Beacon + DME (NDB+DME) Approach
VOR Approach using VORDME/VORTAC

The Airport Approach (PF) and Heliport (HF) Records – Route Type table was revised to include the following new or revised Route Types:

GBAS Procedure
RNAV, Sensor Not Specified
SBAS Procedure

Note 1 and 3 were revised to support the Qualifier Fields.

Commentary on GLS was added.

The Approach examples were revised for clarity.

5.10 Approach Route Identifier (APPROACH IDENT)

This section was updated to support TAA.

5.12 Sequence Number (SEQ NR)

This section was updated to support TAA.

5.17 Waypoint Description Code (DESC CODE)

This section was updated to specifically allow using Airport Records as the "TO FIX" in Enroute Airways.

5.23 Recommended NAVAID (RECD NAV)

This section was updated to include TACAN.

5.29 Altitude Description (ALT DESC)

Text was added to address Altitude Description in ILS coding for Altitude three.

Field content X and Y was added along with a supporting Note.

5.30 Altitude/Minimum Altitude

Text was added to address Altitude Description in ILS coding for Altitude three.

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

Airport and Heliport Localizer, and Airport and Heliport MLS records were added to the Used On section.

5.36 Latitude (LATITUDE)

Path Point Record was removed from the Used On text.

5.37 Longitude (LONGITUDE)

Path Point Record was removed from the Used On text.

5.42 Waypoint Type (TYPE)

New codes were added to column 28 to support the FAA High Altitude redesign.

5.67 Threshold Crossing Height (TCH)

The text was revised to clearly identify the data in the Runway record and Commentary was added noting that the single TCH value provided on the Runway Record may be different from the Approach Continuation Record.

5.70 Vertical Angle (VERT ANGLE)

The vertical angle paragraph was revised to address the Localizer Only Vertical Angle.

5.72 Speed Limit (SPEED LIMIT)

The Definition/Description and the Source/Content were revised to designate whether the speed limit coded at the fix in a terminal procedure is mandatory, minimum or maximum.

5.91 Application Type (USER)

User Application A, C, E, L, N, T, U, V, and Q were added.

5.101 Communication Type (COMM Type)

Automatic Surface Observing System (ASO) communication typed was added.

Air to Air communication type was added.

Aerodrome Weather Information Services (AWIS) communication type was added.

Military Frequency communication type was added.

Pilot Activated Lighting (PAL) communication type was added along with a supporting Note.

5.106 Service Indicator (SERV IND)

Air/Air service indicator was added.

5.143 Grid MORA

A Commentary was added that indicates some MORA values are provided as a representation of government source.

5.146 Sector Bearing (SEC BRG)

This section was updated to support TAA.

5.147 Sector Altitude (SEC ALT)

This section was updated to support TAA.

5.149 Figure of Merit (MERIT)

Section was revised to allow a method to identify those TACANs that are part of the National Air Space (NAS) and those that are not.

5.165 Magnetic/True Indicator (M/T IND)

This section was updated to support TAA.

5.204 ARC Radius (ARC RAD)

Text was added stating that the ARC Radius field is also used to specify the turn radius of RNP holding patterns included in SID, STAR, and Approach Records as HA, HF, and HM legs.

5.222 GPS/FMS Indicator (GPS/FMS IND)

Section was modified to update the flagging procedures for WAAS.

5.225 Ellipsoidal Height

The resolution was changed to a tenth of a meter.

5.227 Orthometric Height (ORTH HGT)

The resolution was changed to a tenth of a meter.

5.228 Course Width At Threshold (CRS WDTH)

The width was revised to meters and ends in a resolution of 0.25 meters, and when the procedure is a helicopter alighting point, the value is 38 meters.

5.244 GLS Channel

The section was revised to clearly identify Channel numbers for GBAS and SBAS.

5.259 Length Offset (OFFSET)

The Length Offset value was revised meters.

5.261 Speed Limit Description

New section added to designate whether speed limit coded at a fix in a terminal procedure is mandatory, minimum or maximum speed.

5.262 Approach Type Identifier (ATI)

New section added to support the Path Point Record.

5.263 HAL

New section added to support the Path Point Record.

5.264 VAL

New section added to support the Path Point Record.

5.265 Path Point TCH

New section added to support the Path Point Record.

5.266 TCH Units Indicator

New section added to support the Path Point Record.

5.267 High Precision Latitude (HPLAT)

New section added to support the Path Point Record.

5.268 High Precision Longitude (HPLONG)

New section added to support the Path Point Record.

5.269 Helicopter Procedure Course (HPC)

New section added to support the Path Point Record.

5.270 TCH Value Indicator (TCHVI)

The section was added to address Altitude Description in ILS Coding to address “Altitude Three.

5.271 Procedure Turn (PROC TURN)

This section was added to support TAA.

5.272 TAA Sector Identifier

This section was added to support TAA.

5.273 TAA IAF Waypoint

This section was added to support TAA.

5.274 TAA Sector Radius

This section was added to support TAA.

Figure 5-7 Procedure Use

Figure was updated to support TACAN.

6.1 General

The section was revised to remove the outdated references to magnetic tape formats.

6.2 Header Record

Title and the section were revised to remove the obsolete references to magnetic tape formats.

6.2.1 Header Record 1

New section added by this supplement.

6.2.2 Header Record 2

New section added by this supplement.

6.3 Bit Density

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.4 Coding

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.5 Parity Convention

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.6 Reel-File Relationship

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.7 Labels

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.7.1 Volume Header Label (VOL)

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.7.2 Header 1 Label (HDR 1)

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.7.3 Header 2 Label (HDR 2)

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.7.4 End-of-File Trailer Label (EOF)

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.7.5 End-of-Volume Trailer Label (EOV)

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.8 Tape Marks

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.9 Summary of Tape Data Layout

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.9.1 One File, One Reel

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.9.2 One File, Multiple Reels

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.9.3 Multiple Files, One Reel

This section was deleted and replaced by Section 6.2.1 and 6.2.2.

6.11 Application of CRC for Integrity Protection of Straight & Advanced Landing Approach Operations

Text was added to refer RTCA DO-229C for Final Approach Segment Data Block and CRC standards.

6.11.1 Data Block Structure,M(x)

This section was deleted when Section 6.11 was revised to refer to RTCA DO-229C.

6.11.2 RNAV-GPS/GLS Approach Procedure Path Point Data Fields Bits

This section was deleted when Section 6.11 was revised to refer to RTCA DO-229C.

6.11.3 CRC – Generator Polynomial G(x)

This section was deleted when Section 6.11 was revised to refer to RTCA DO-229C.

ATTACHMENT 1 FLOW DIAGRAM

The obsolete terms Tapes and Cassettes were removed and revised text was added.

The Notes were revised to remove obsolete text.

ATTACHMENT 5 PATH AND TERMINATOR

1.2 Beginning and Ending Leg Types

SID Runway Transition, removed flag Note 1 from FM and VM.

SID, Beginning Leg List, removed flag note 1 from FM and VM, and flag note 3 from VM. Ending Leg, added FM and VM.

1.3 Leg Sequencing

FA/IF leg combination was changed to a valid leg combination.

1.4 Leg Type Description

Revised the text for HA, HF, and HM in the description block.

1.5 Leg Data Field

HA, HF, and HM leg in the "HLD" column was changed to invalid. AF, CF, DF, IF, RF, and TF changed to optional.

HA, HF, and HM legs in the TD field changed to required from optional.

HA, HF, and HM in the Overfly column changed to optional, and TF leg was changed to "B."

RF in the MAP field was changed to Optional.

AF, IF, RF, and TF field was changed to Optional.

RF in the THETA field changed to I and Legend I was added for inbound tangential track.

VD in the TM/DST field changed to DME Distance.

Legend T and I were added.

3.0 Path and Termination Related Rules Valid For All Procedure Types

Rule 3.5 and 3.6 were revised to include RF.

Rule 3.14 was revised to exclude leg combination IF/RF, RF/RF or Hx.

4.0 STANDARD INSTRUMENT DEPARTURE (SID) CODING R.ULES

Rule 4.1 was revised so that RNAV Departure Procedure requires an initial turn is excess of 15 degrees unless certain conditions are met.

Rule 4.3 and Rule 4.4 was revised in correlation with Section 1.2, Beginning and Ending Leg Types to allow a single VM leg for a SID.

6.0 APPROACH PROCEDURE RULES VALID FOR ALL PROCEDURE TYPES

The following text was added to Rule 6.2.3:

"When a VORDME or VORTAC is coded as the recommended Navaid in approach procedure coding, the Navaid will be within 40 NM of the fix in which it is coded. 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."

Rule 6.2.5 was revised to specify what approach procedure coding will include a Final Approach Course Fix.

Rules 6.2.5.1, 6.2.5.2, 6.2.5.3, and 6.2.5.4 were revised to support the FACF coding.

Rule 6.2.10.2.d was modified to require an altitude in the leg from FEP to MAP.

Rule 6.5.3.2 was revised to remove the reference to the overfly bit.

Rule 6.3.6.1 was revised to support FACF coding.

Rule 6.3.6.2 was revised to include TACAN

Rule 6.3.6.3 was deleted.

Rule 6.3.6.3.4 was revised to state if the angles between 10 and 90 degrees may be coded as required by source documentation, provide the resulting intercept is within the reception area of the localizer.

Rule 6.3.6.5 and 6.4.2.1 were revised to include FACF.

Rule 6.5.3.2 was revised to remove obsolete text.

The following text was added to Rule 6.6.1.2.b:

"The final approach will include a FACF when one is required by Rule 6.2.5."

Rule 6.6.3.1 was revised to include missed approach point.

The following text was added to Rule 6.6.3.3:

"RF legs may be used in the final approach segment of RNAV approaches."

Rule 6.7, 6.7.1, 6.7.1.1, and 6.7.1.2 were deleted and Rules 6.7.2, 6.7.2.1, and 6.7.2.2 were renumbered to 6.7, 6.7.1 and 6.7.2.

The following text was added to Rule 6.7.2.2:

"The final approach will include a FACF when one is required by Rule 6.2.5."

Rule 6.8.1.1.was deleted as it is redundant with Rule 6.2.5.2.

The following text was added to Rule 6.8.1.2:

"The final approach will include a FACF when one is required by Rule 6.2.5."

Rule 6.8.1.3 was revised to include "or FACF when coded."

Rule 6.8.1.4 was revised to include FACF when coded.

7.0 Precision Approach Procedure Coding

Rule 7.4.3.2 was added for RF legs.

8.0 NON-PRECISION APPROACH PROCEDURE CODING

Rule 8.1.1 was revised to refer to Rule 6.2.5.2.

Rule 8.1.2 was added to indicated that all must be coded in the Missed Approach Point (MAP).

Rule 8.3.2 was revised to refer to Rule 6.2.5.

The following text was added to Rule 8.3.4.2:

"The final approach will include a FACF when one is required by Rule 6.2.5."

Rules 8.3.6, 8.3.6.1, 8.3.6.2, and 8.3.6.3 were deleted.

Rule 8.4.2 was deleted as 6.2.5.2 was revised and the rule is now redundant.

The following text was added to Rule 8.4.3:

"The final approach will include a FACF when one is required by Rule 6.2.5."

Rule 8.7.1 was revised to support approach transition can end in a leg to the FAF and that the FACF fix is required only on Localizer based procedures and optional when provided by source as FACF or IF.

Rule 8.9.1.1 was added to support TCH.

Rule 8.9.9 was added to support step-down fix coding.

Rule 8.10, 8.10.1, 8.10.2, 8.10.3, and the associated VNAV Approach Coding examples 14, 15, A, B, C, and C were added by this supplement.

9.0 Missed Approach Procedure Rules Valid For All Procedure Types

Rules 9.3.1.2, 9.3.1.3, 9.3.1.4, and 9.3.1.5 were revised in their entirety to clarify the coding of first leg of Missed Approach coding.

Ruled 9.4, 9.4.1, 94.1.1, 9.4.1.2, 9.4.1.3, 9.4.1.4, and 9.4.1.5 were deleted.

Rule 9.5.2 was revised in its entirety that the reference Navaid must be used as the Recommended Navaid when required.

Rule 9.5.2.2 was deleted.

Rule 9.5.2.4 was added to so that when the first leg if a Missed Approach Procedure is coded as HA or HM leg the coding will also include a government source provided altitude.

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SUPPLEMENT 18

TO

ARINC SPECIFICATION 424

NAVIGATION SYSTEM DATA BASE

Published: November 23, 2005

Prepared by the Airlines Electronic Engineering Committee

Adopted by the Airlines Electronic Engineering Committee: October 5, 2005

A. PURPOSE OF THIS SUPPLEMENT

This supplement introduces revisions and additions to the body and attachments of ARINC Specification 424. The majority of the changes were added to support level of service based on published procedure operating minimums information for sensor independent RNAV Approach procedures.

B. ORGANIZATION OF THIS DOCUMENT

This document, printed on goldenrod paper, contains descriptions of changes introduced into ARINC Specification 424 by this supplement. The material in Supplement 18 is integrated into ARINC Specification 424 to form an updated version of the standard.

The changes introduced by Supplement 18 have been identified using change bars.

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.

2.3 Precision RNAV Terms

Final Approach Segment (FAS) Data Block and Level of Service (LPV, LNAV/VNAV, and LNAV) were added.

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

Text was added to clarify that Approach file contains the sequential listing of published Airport Standard instrument Approach Procedures

4.1.9.1 Airport SID/STAR/Approach Primary Records

Note 2 was revised for clarity. Note 4 was added to support RNP criteria.

4.1.9.2 Airport SID/STAR/Approach Primary Extension Continuation Records

Column 86 thru 89 was revised to Blank from Procedure Category. Note 2 was revised to support RNP Procedures with multiple RNP values.

4.1.9.5 Airport Procedure Data Continuation Record

New section added to contain information for airport Approach Procedures for which SBAS is authorized.

4.1.10.1 Runway Primary Records

LTP Ellipsoid Height was added to columns 61-66.

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

Text was added to indicate the STAR File contains the sequential listing of published Heliport Standard Terminal Arrival Routes. The Approach File contains the sequential listing of published Heliport Standard Instrument Approach Procedures.

4.2.3.1 Heliport SID/STAR/Approach Primary Records

Note 2 was revised for clarity.

4.2.3.2 Heliport SID/STAR/Approach Primary Extension Continuation Records

Column 86 thru 89 was revised to Blank from Procedure Category. Note 2 was revised to support RNP Procedures with multiple RNP values.

4.2.3.5 Heliport Procedure Continuation Records

New section added to contain information for airport Approach Procedures for which SBAS is authorized.

5.5 Subsection Code (SUB CODE)

The section and subsection encoding scheme table were revised to support RNAV Name Table.

5.7 Route Type (RT TYPE)

The Airport Approach (PF) and Heliport (HF) Record table were revised. Notes 1, 2, 3, 4, and 5 were revised and Note 6 was added.

5.91 Continuation Record Application Type (APPL)

Field Content “W” was added for SBAS authorized.

5.222 GNSS/FMS Indicator (GNSS/FMS IND)

The title and text was revised to GNSS from GPS as RNAV is part of the new ICAO procedure naming convention.

Note 1 was added for GNSS overlay.

5.225 Ellipsoidal Height

Source/Content text was revised for clarity and the Runway Record was added to the Used on text.

5.275 Level of Service Name (LSN)

New section added to support level of service based on published procedure operating minimums information for sensor independent RNAV Approach Procedures.

5.276 Level of Service Authorized

New section added to support the level of operating criteria for RNAV approach procedures identified by FAA TSO-C146a.

ARINC Standard – Errata Report

1. Document Title

ARINC Specification 474-18: *Navigation System Data Base*

2. Reference

Page Number:______ Section Number: ______________ Date of Submission: ______________

3. Error

(Reproduce the material in error, as it appears in the standard.)

4. Recommended Correction

(Reproduce the correction as it would appear in the corrected version of the material.)

5. Reason for Correction

(State why the correction is necessary.)

6. Submitter (Optional)

(Name, organization, contact information, e.g., phone, email address.)

Note: Items 2-5 may be repeated for additional errata. All recommendations will be evaluated by the staff. Any substantive changes will require submission to the relevant subcommittee for incorporation into a subsequent supplement.

Please return comments to fax +1 410-266-2047 or standards@arinc.com

ARINC IA Project Initiation/Modification (APIM)

1.0 Name of Proposed Project **APIM #: _____**

(Insert name of proposed project.)

2.0 Subcommittee Assignment and Project Support

2.1 Identify AEEC Group

(Identify an existing or new AEEC group.)

2.2 Support for the activity

Airlines: *(Identify each company by name.)*
Airframe Manufacturers:
Suppliers:
Others:

2.3 Commitment for resources (Identify each company by name.)

Airlines:
Airframe Manufacturers:
Suppliers:
Others:

2.4 Chairman: (Recommended name of Chairman.)

2.5 Recommended Coordination with other groups

(List other AEEC subcommittees or other groups.)

3.0 Project Scope (why and when standard is needed)

3.1 Description

(Insert scope. Use the following symbol to check yes or no below. ☒)

3.2 Planned usage of the envisioned specification

New aircraft developments planned to use this specification yes ❑ no ❑

Airbus: *(aircraft & date)*
Boeing: *(aircraft & date)*
Other: *(manufacturer, aircraft & date)*

Modification/retrofit requirement yes ❑ no ❑

Specify: *(aircraft & date)*

Needed for airframe manufacturer or airline project yes ❑ no ❑

Specify: *(aircraft & date)*

Mandate/regulatory requirement yes ❑ no ❑

Program and date: *(program & date)*

Is the activity defining/changing an infrastructure standard? yes ❑ no ❑

Specify *(e.g., ARINC 429)*

When is the ARINC standard required?

______*(month/year)*__________

What is driving this date? _______*(state reason)*_____________________
Are 18 months (min) available for standardization work? yes ❑ no ❑
If NO please specify solution: _________________
Are Patent(s) involved? yes ❑
If YES please describe, identify patent holder: _________________

3.3 Issues to be worked

(Describe any major issues to be addressed.)

4.0 Benefits

4.1 Basic benefits

Operational enhancements yes ❑ no ❑
For equipment standards:
a. Is this a hardware characteristic? yes ❑ no ❑
b. Is this a softwareware characteristic? yes ❑ no ❑
c. Interchangeable interface definition? yes ❑ no ❑
d. Interchangeable function definition? yes ❑ no ❑
If not fully interchangeable, please explain: _________________
Is this a software interface and protocol standard? yes ❑ no ❑
Specify: _________________
Product offered by more than one supplier yes ❑ no ❑
Identify: *(company name)*

4.2 Specific project benefits

(Describe overall project benefits.)

4.3 Benefits for Airlines

(Describe any benefits unique to the airline point of view.)

4.4 Benefits for Airframe Manufacturers

(Describe any benefits unique to the airframe manufacturer's point of view.)

4.5 Benefits for Avionics Equipment Suppliers

(Describe any benefit unique to the equipment supplier's point of view.)

5.0 Documents to be Produced and Date of Expected Result

5.1 Meetings and Expected Document Completion

The following table identifies the number of meetings and proposed meeting days needed to produce the documents described above.

Activity	Mtgs	Mtg-Days (Total)	Expected Start Date	Expected Completion Date
Document a	*# of mtgs*	*# of mtg days*	*mm/yyyy*	*mm/yyyy*
Document b	*# of mtgs*	*# of mtg days*	*mm/yyyy*	*mm/yyyy*

6.0 Comments

(Insert any other information.)