ORDER

8260.19C

Flight Procedures and Airspace

September 16, 1993

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Distribution: ZVN-826

Initiated By: AVN-220

FOREWORD

This order provides guidance for all personnel in the administration of the Flight Procedures and Airspace Program.

It defines responsibilities, establishes criteria, and provides standards to assure effective and orderly processing of all types of procedures actions.

Procedures personnel must use sound judgement, imagination, and initiative in carrying out their assigned responsibilities and duties. They are encouraged to recommend improved methods of operation.

William H. Williams, Jr.
Director of Aviation System Standards

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CHAPTER 1. ADMINISTRATIVE

SECTION 1. GENERAL

100. PURPOSE

This order provides guidance to all FAA personnel for the administration and accomplishment of the FAA Flight Procedures and Airspace Program.

101. DISTRIBUTION.

This order is distributed to offices on special mailing list ZVN-826.

102. CANCELLATION. Order 8260.19B, Flight Procedures and Airspace, dated December 18, 1991, is canceled.

103. EXPLANATION OF CHANGES.

a. Use of maps and charts clarified.

b. Expanded service volume (ESV) distribution modified.

c. Use of Notice to Airmen (NOTAM) system modified.

d. Airway NOTAM'S introduced with examples.

e. Periodic (annual) standard instrument approach procedure (SIAP) review interval extended to two years; airway review interval to four years.

f. Instrument Approach Procedures Automation (IAPA) procedure development and storage clarified.

g. Instructions for reporting IAPA equipment or communications problems added.

h. All references to control zones changed to "Class B/C/D/E Surface Areas;" and references to transition areas changed to "Class E 700' airspace."

i. Flight Inspection Office (FIO)/Air Traffic Control (ATC) actions regarding minimum vector altitude (MVA) / Minimum IFR Altitude (MIA) charts clarified.

j. Instructions regarding area navigation (RNAV) feeder routes incorporated.

k. Requirement for drawings with airspace packages deleted.

l. Rounding convention clarified.

m. Terminal distance measuring equipment (DME) fix designations clarified.

n. "LOC only" notation clarified.

o. Alternate minimums notation clarified.

p. Dual minimums notes clarified.

q. Inoperative component notes clarified.

r. Automatic weather observation system (AWOS) instructions modified.

s. Additional flight data block instructions for LORAN-C added.

t. FAA Form 8260-2 controlling obstruction documentation clarified.

u. FAA Form 8260-9 required obstruction clearance (ROC) and height of missed approach surface (HMAS) documentation clarified.

v. FAA Form 8260-16 changeover point (COP) instructions clarified; flight inspection date and cancellation instructions clarified.

w. Numerous flight procedure references added to appendix 1.

x. FAA 8260-series forms examples udpated.

104. FORMS.

a. The following forms are stocked at the FAA Logistics Center (AML), or provided in electronic form for use in the development and maintenance of flight procedures

FAA FORM NUMBER	TITLE	NATIONAL STOCK NUMBER(NSN)	UNIT OF ISSUE
FAA Form 8260-1	Flight Procedures Standards Waiver	0052-00-661-8001	SH
FAA Form 8260-2	Radio Fix and Holding Data Record	0052-00-606-9001	SH
FAA Form 8260-3	ILS-Standard Instrument Approach Procedure	0052-00-691-2003	SH
FAA Form 8260-4	Radar-Standard Instrument Approach Procedure	0052-00-691-3001	SH
FAA Form 8260-5	Standard Instrument Approach Procedure	0052-00-677-7002	SH
FAA Form 8260-7	Special Instrument Approach Procedure	0052-00-684-3001	SH
FAA Form 8260-8	Form Letter for Coordination of SIAP	0052-00-683-5000	SH
FAA Form 8260-9	Standard Instrument Approach Procedure Data Record	0052-00-684-6000	SH
FAA Form 8260-10	Standard Instrument Approach Procedure (Continuation Sheet)	0052-00-691-4002	SH
FAA Form 8260-11	U.S. Army ILS Standard Instrument Approach Procedure	0052-00-803-1001	SH
FAA Form 8260-12	U.S. Army Radar Standard Instrument Approach Procedure	0052-00-803-2001	SH
FAA Form 8260-13	U.S. Army Standard Instrument Approach Procedure	0052-00-803-3001	SH
FAA Form 8260-15	Departure Procedures/Takeoff Minimums	0052-00-838-8001	SH
FAA Form 8260-16	Transmittal of Airways/Route Data	0052-00-634-4001	SH
FAA Form 8260-20	U.S. Army Standard Instrument Approach Procedure(Continuation Sheet)	0052-00-856-5000	SH
FAA Form 8260-21	U.S. Army Departure Procedures/ Takeoff	0052-00-856-6000	SH
FAA Form 8260-22	MLS-Standard Instrument Approach Procedure	0052-00-889-8000	SH

b. Computer Generated Forms. Most FAA forms used in the development of instrument procedures can be automated through the use of an approved electronic forms software package.

(1) Implementation. The implementation of this system will reduce the errors and tedium of filling procedures forms either by hand or the typewriter. This system also allows information to be extracted from sources such as text files and other databases.

(2) Use of Automated Forms. This automated process allows each user to fill in forms completely and accurately, and to print the forms. The Flight Procedure Standards Branch, AFS-420, provides administrative control over any modification of the automated forms. Direct any recommendations for changes or modifications to AFS-420 with a courtesy copy to the Automation Technology Branch, AVN-22A.

(3) Equipment Requirements. Each user office must have access to the appropriate hardware/software to use automated electronic forms software. Contact AVN-22A for more specific requirements.

(4) System Description. This electronic form processor has a visual interface and allows each user to work with forms using windows, pictures, and menus on a screen. The completed screen data and form may be printed on bond paper.

c. IAPA Generated Forms. Refer to chapter 2, section 13.

105. TERMS AND DEFINITIONS.

For the purpose of this order, flight procedures are identified as the functions for predetermining safe and practical methods of navigating aircraft which prescribe intended flight tracks, operational altitudes, and arrival/departure minimums. Flight procedures are subdivided into six general categories as follows: departure procedure, en route, instrument approach, missed approach, holding, and fix descriptions. The following words have the meaning shown:

a. May – action is permissible

b. Shall – action is mandatory.

c. Should – action is desirable.

d. Will – indicates a presumption that action is to be taken.

e. AWOP – All Weather Operations Program.

f. 14 CFR – Title 14 of the Code of Federal Regulations.

g. FICO – Flight Inspection Central Operations Office, AVN-250.

h. Flight Inspection Operations Division, AVN-200.

i. FPO – Flight Procedures Office.

j. IAPA – Instrument Approach Procedures Automation.

k. Miles – nautical miles unless otherwise specified.

l. NFDC – National Flight Data Center, ATA-110.

m. NTAP – Notices to Airmen Publication.

n. NFPO – National Flight Procedures Office, AVN-100.

o. SIAP – Standard Instrument Approach Procedure.

p. USNOF – U.S. NOTAM Office.

106. INFORMATION CURRENCY.

a. Forward for consideration any deficiencies found, clarification needed, or suggested improvements regarding the contents of this order to:

DOT/FAA
Flight Procedure Standards Branch, AFS-420
P.O. Box 25082
Oklahoma City, OK 73125

b. Your assistance is welcome. FAA Form 1320-9, Directive Feedback Information, is included at the end of this order for your convenience If an interpretation is needed immediately, you may call the originating office for guidance. However, you should use the FAA Form 1320-9 as a follow-up to the verbal conversation.

c. **Use the "Other Comments" block** of this form providing a complete explanation of why the suggested change is necessary.

107-109. RESERVED

SECTION 2. RESPONSIBILITIES

110. FLIGHT STANDARDS SERVICE (AFS-1)

a. Flight Standards Service is responsible for the use of air navigation facilities, appliances, and systems by aircraft operating in established environments and the National Airspace System (NAS). Responsibility includes governing policy and oversight of manual and automated development and maintenance of terminal and en route flight procedures. The director has final authority to issue, amend, and terminate rules and regulations relating to instrument procedures, minimum en route altitudes, flight procedures, operational weather minimums, and minimum equipment requirements.

b. Responsibility for the overall management of the Flight Procedures and Airspace Program is vested in the Flight Technologies and Procedures Division (AFS-400). This order is primarily concerned with those offices having direct responsibility for the accomplishment of the Flight Procedures and Airspace Program. The following is a brief description of their activities.

111. FLIGHT TECHNOLOGIES AND PROCEDURES DIVISION (AFS-400).

a. This division is the principal element of the Flight Standards Service governing policies, criteria, and standards for establishing and maintaining terminal and en route flight procedures; for using air navigation facilities, appliances, and systems; and for certification of IAPA software. This office is designated as the final authority to issue, amend and appeal minimum en route IFR altitudes and associated flight data under 14 CFR part 95 and standard instrument approach procedures under 14 CFR part 97. The division is also responsible for approval/disapproval of special instrument approach procedures and requests for waivers of standards.

b. The Flight Operations Branch, AFS-410, is the principal element of the division with respect to concepts, policies, systems, and programs associated with the operational and flight technical aspects of all weather operations. It develops concepts for design, evaluation, and approval of Category I, II, and III approach and landing operations, as well as lower than standard takeoff minimums.

c. The Flight Procedure Standards Branch, AFS-420, is the principal element within the division, with respect to the rulemaking process of the Flight Procedures Program; also with respect to the development, application, and oversight of national policies and directives for the administration of the national flight procedures program, and development of criteria pertinent to the design of instrument flight procedures; and with respect to testing, data analysis, verification, and validation of navigation systems and concepts. This branch serves as the focal point within Flight Standards for all matters relating to airspace and cartographic programs, and is the primary interface for industry on matters relating to instrument procedures criteria. It participates as the division focal point in the waiver review process, soliciting comments from appropriate FAA offices, providing operational input, and recommending the division final waiver approval/disapproval. The branch provides technical advice and assistance to other FAA elements, government agencies, and industry on the interpretation and application of criteria. It analyzes and evaluates execution of flight procedure programs within the FAA to determine compliance with national policy. It also provides for the technical evaluation and risk assessment of proposed instrument operations not covered by standard criteria.

112. REGIONAL FLIGHT STANDARDS DIVISIONS (AXX-200)

a. The Regional Flight Standards Divisions (FSD) manage and direct the geographic regions' air carrier, general aviation and all weather operations programs. Each FSD provides the regional implementation of national concepts, policies, standards, systems, procedures and programs with respect to the operational and flight technical aspects of the all weather operations program.

b. The all weather operations program responsibilities include but are not limited to the following:

(1) Establishing regional requirements for, and managing distribution of, special instrument approach procedures. Receiving and resolving user/industry comments on new and revised special instrument approach procedures.

(2) **Providing technical evaluations** in support of regional airspace programs to determine the effect on visual flight operations.

(3) **Coordinating the FSD portion** of assigned foreign instrument approach procedures programs.

(4) **Coordinating the FSD involvement** in Category II and III approvals including approval of the associated Surface Movement Guidance System plan.

(5) **Providing the operational input** on matters related to regional capacity studies and airport operational safety initiatives.

(6) **Performing airport/airspace** evaluations to address operational safety issues in coordination with Airports Division, as necessary.

(7) **Providing the consolidated FSD** position for review of charted visual flight procedures.

(8) **Coordinating with** Airports Division in the approval or denial of modifications to airport standards.

(9) **Providing operational review** and comments for Airway Facilities Division's submission of a NAS Change Proposal (NCP).

(10) **When requested by the FPO**, assists in developing the equivalent level of safety for an AVN originated procedures waiver.

113. AVIATION SYSTEM STANDARDS (AVN).

a. AVN is the principal element within Airway Facilities Service (AAF) directly responsible for the in-flight inspection of air navigation facilities and for the development and maintenance of instrument flight procedures throughout the United States and its territories. It is responsible for input to the regional Airway Facilities Division Facilities and Equipment (F&E) budget submission with respect to terminal air navigation aids (other than radar) and visual approach aids. Additionally, AVN supports the Air Traffic Services (ATS) obstruction evaluation and airport airspace analysis (OE/AAA) program.

b. The National Flight Procedures Office, AVN-100, is the AVN element responsible for the development, maintenance, quality control, and technical approval of public-use instrument procedures. It is also responsible for quality control and technical support, as requested, for NAS related products. Upon completion of instrument procedures development, the division forwards completed documentation to the FICO for flight inspection and operational approval. Establishes procedures to ensure GPS data is included in the national database. Responsibilities include but are not limited to:

(1) **Forwarding industry and user comments** on instrument procedures to the appropriate branch manager for evaluation and processing.

(2) **Coordinating requests** for new instrument procedures service with the respective regional division and other concerned offices, and conducting instrument procedures feasibility studies.

(3) **Coordinating submission** by responsible offices of all pertinent data and supporting documents required for procedures development and assignment of priority when further procedures action is required.

(4) **Planning and coordinating** new or relocated NAS facilities.

(5) **Coordinating with regional divisions** to select a charting date consistent with priorities and workload when a component of the National Airspace System (NAS) is to be commissioned, decommissioned, or altered.

(6) **Coordinating the input** for the planning and development of regional F&E budget submissions and programming actions.

(7) **Analyzing obstruction evaluations** to determine the effects on current and planned instrument flight operations, minimums, and/or flight altitudes of all civil, joint-use, and U.S. Army instrument procedures in accordance with current policy.

(8) **Evaluating regional airport** and airspace matters.

(9) **Determining the necessity** for environmental impact studies as required by current policy.

(10) **Acting as focal point** for flight inspection problems within the region.

c. The Flight Inspection Operations Division, AVN-200, is the AVN element responsible for flight inspection of navigation aids and flight procedures in support of the NAS. The division initiates and completes investigative remedial action with respect to any deficiency or reported hazard, including restrictions or emergency revisions to procedures. It maintains liaison with AVN-100, as well as other FAA offices, civil and military interests, to ensure consideration of all requirements relating to the procedural use of navigation facilities. It maintains a suitable record system reflecting the status of each flight procedure with required supporting data.

114. AERONAUTICAL INFORMATION SERVICES (ATA-100).

a. This is the principal element within Air Traffic Service (AAT) directly responsible for managing the agency's program to provide aeronautical infor-mation services to ensure the flow of information necessary for safety, regularity, and efficiency of air navigation. This division is charged with the responsibility for collecting, collating, validating and disseminating aeronautical data regarding the United States and its territories. It is also a source for technical assistance to AVN regarding data base accuracy standards, content, and format. This division also serves as the primary interface between the FAA and the National Oceanic and Atmospheric Administration for government aeronautical charting services.

b. The National Flight Data Center, ATA-110, is the principal element within ATA-100 with respect to maintaining the national aeronautical information data base and for disseminating information relating to the NAS. NFDC responsibilities include but are not limited to:

(1) **Publishing the daily National Flight Data Digest (NFDD)** to promulgate additions, changes, and deletions to elements of the NAS.

(2) **Conducting pre-publication review** of aeronautical data contained in standard instrument approach and departure procedures, standard terminal arrival routes, standard instrument departures, military training routes, navigational aids, airport data, and airspace actions submitted for action, and to identify and correct items in non-conformance with applicable directives.

(3) **Validating submitted data** with the National Data Base and resolving contradictions.

(4) **Reviewing, processing for transmittal,** and tracking NOTAM's regarding amendments, cancellations, and corrections to instrument procedures in the NAS and canceling these NOTAM's when government charts are updated.

(5) **Compiling NOTAM's** for publication in the Notices to Airmen Publication (NTAP).

(6) **Managing the development** and assignment of five-letter fix names and NAVAID/airport identifiers.

(7) **Promulgating SIAP's** with assigned effective dates in a bi-weekly transmittal letter and completing necessary requirements for publication in 14 CFR part 97.

(8) **Issuing, on a predetermined schedule,** amendments to 14 CFR part 95.

(9) **Maintaining copies** of 8260 and 7100 series forms that support public use SIAP's, fixes, airways, STAR's and DP's (SID's).

115. INDIVIDUAL.

Personnel working within the Flight Procedures Program are responsible for maintaining professional knowledge in a technical, complex, and specialized field, and for the application of the knowledge to assure safety and practicality in air navigation. Where directives are deficient, each individual shall take the initiative to seek an acceptable method of resolution and to inform the responsible office of any recommended change to policy, procedures, etc., that is cost beneficial and/or provides increased operational safety.

SECTION 3. INSTRUMENT APPROACH PROCEDURES AUTOMATION (IAPA) RESPONSIBILITIES

120. BACKGROUND.

a. The FAA has developed IAPA to automate the mechanics of the Instrument Flight Procedures Program to include the development, review, storage, and electronic transmittal of instrument flight procedures with ancillary system benefits.

b. The IAPA system standardizes the application of criteria specified in FAA Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS); FAA Order 8260.19, Flight Procedures and Airspace; and other appropriate directives, advisory circulars, and Federal Aviation Regulations. IAPA applies established FAA software standards. IAPA software provides for application of standardized data and data accuracy standards in the development of instrument flight procedures.

c. IAPA includes obstacles, terrain, NAVAID, fix, holding, airport, and runway data that are available to system users. IAPA is included in the FAA's Capital Investment Plan (CIP). Procedures for controlling changes to this system will be in accordance with FAA Order 1370.52, Information Resources Policy.

121. AVIATION SYSTEM STANDARDS RESPONSIBILITY.

The Aviation System Standards, AVN-1, is the office of primary interest and is responsible for overall functional management of the IAPA system and has been delegated responsibility for certification of IAPA software (see paragraph 121b(7)).

a. The Resource Management Staff, AVN-20, is responsible for establishing policy guidance in the administrative control of IAPA, as well as coordinating actions required to meet changing legal and user requirements. In addition, this division is responsible for:

(1) Carrying out the development of IAPA by coordinating the efforts of users, developers, operators, and contractors associated with IAPA.

(2) Managing and reporting on project schedules, costs, and other supporting resources for the Airway Facilities Service (AAF) Information Resource Manager.

(3) Establishing and maintaining a positive change control management system through the developmental and implementation phases to assure that the completed project (the operational IAPA system) meets the requirements of the system definition.

(4) Determining that all proposed changes are essential to the development task and are coordinated among all prospective users of the system.

(5) Keeping contracting officers advised, if appropriate, on proposed changes in order that the officer may be alerted to the impact that they may have on current or proposed contractual actions.

(6) Preparing for and participating in operational tests and evaluations of the information system.

b. The Automation Technology Branch, AVN-22, is responsible for assuring the successful ongoing operation of the data system. In the performance of these responsibilities, the Automation Technology Branch shall:

(1) Establish and maintain a positive change control management system to assure that all changes to the operational IAPA system are cost effective and are coordinated among all parties who use IAPA.

(2) Develop necessary guidelines for the control and dissemination of data from IAPA and other assigned systems.

(3) Authorize release of data in special cases where guidelines are not available.

(4) Provide for coordination in data systems where several program elements share primary operational interest.

(5) **Establish priorities** for task assignments, scheduling, and utilization of personnel and physical resources.

(6) **Assure system configuration**, documentation, and reliability.

(7) **Conduct extensive operational testing** and debugging, to assure system software is in conformance with Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS) and other appropriate directives, advisory circulars, and 14 CFR provisions. Conduct final system certification of software before release to users through coordination with AFS-420.

(8) **Review national user requirements** and approve system modifications.

(9) **Ensure that the provisions** of FAA Order 1600.54B, FAA Automated Information Systems Security Handbook, are complied with in the security control of computer programs and associated documentation.

c. **The Flight Inspection Technical Support Branch, AVN-210,** is responsible for establishing and maintaining the Aviation Standards Information System (ASIS) in support of IAPA requirements.

d. **AVN-100 is responsible** for final certification of instrument flight procedures to include that:

(1) **Data used to develop** the instrument approach procedure was correct.

(2) **The instrument approach procedure** was developed in accordance with FAA Order 8260.3; Order 8260.19, Flight Procedures and Airspace; and other appropriate directives, advisory circulars, and Federal Aviation Regulations listed in appendix 1.

(3) **The appropriate Flight Procedures Standards Waiver**, if required, is on file.

122. OFFICE OF INFORMATION SERVICES RESPONSIBILITY.

The Office of Information Services, ~~AMI~~ AIT-1, is responsible for the software development from its inception through implementation. It is also responsible for maintenance of system software, and shall provide and control automatic data processing (ADP) resources which include:

a. **The utilization of personnel** (including contract personnel) and physical resources.

b. **Providing technical consultation** and advice as required.

c. **Providing telecommunications support**, and other necessary ADP enhancement and support services for IAPA.

d. **Participating in the review** of site preparation, installation, and testing support as required.

e. **Providing on-site hardware** and software installation and testing support as required.

f. **Providing preliminary testing** of software to assure conformance with the United States Standard for Terminal Instrument Procedures and other appropriate directives, advisory circulars, and Federal Aviation Regulations as advised by the program office.

123. OFFICE OF INFORMATION TECHNOLOGY RESPONSIBILITY.

The Office of Information Technology, AIT-1, will develop governing policies and responsibilities for automatic data processing (ADP) program management in accordance with Order 1370.52, Information Resources Policy.

124. DIRECTOR, AIRWAY FACILITIES SERVICE.

The Director, Airway Facilities Service, AAF-1, is responsible for the determination of agency-wide priorities for use and control of telecommunications resources needed to support IAPA. This responsibility is administered through the Telecommunications Integrated Product Team in the NAS Operations Program (AOP) of Airway Facilities.

125-199. RESERVED.

CHAPTER 2. GENERAL PROCEDURES

SECTION 1. GENERAL

200. GENERAL.

This chapter provides guidelines and procedures which are common to all instrument flight procedures. Specific guidelines and procedures for en route and terminal instrument flight procedures are contained in chapters 3 and 4, respectively.

201. REQUESTS FOR PUBLIC-USE INSTRUMENT FLIGHT PROCEDURES.

a. Requests for approval and/or establishment of instrument flight procedures may originate from many different sources. It may be a request from a state, city, airport manager, or an individual. It may also be from an air carrier, air taxi, military, commercial operator, Air Traffic Control (ATC), or AFS personnel. See Order 8260.3, paragraph 121.

b. All requests for public-use instrument flight procedures received by any FAA office shall be forwarded to AVN-100 for further handling. Requirements for approval of instrument approach procedures are contained in Chapter 1 of Order 8260.3.

c. Procedures with specific effective dates, and other urgent projects, will be assigned priorities by AVN-100. All other projects will be processed as workload permits, in order of AVN-100 receipt.

202. AIR TRAFFIC LETTERS OF AGREEMENT.

When letters of agreement affect or include flight procedures, they must be coordinated between ATC facilities and AVN-100.

a. When these letters are received, AVN-100 shall review them to ensure compatibility with published or planned flight procedures.

b. Copies of letters of agreement received in AVN-100 shall be made a part of the procedure files, to serve as a reference when developing or amending flight procedures.

c. When the terms of the letters of agreement and flight procedures are not compatible, or if it is determined that the terms do not comply with criteria, AVN-100 shall return the letters to the ATC facility with a memorandum which explains the findings. When appropriate and practical, consideration should be given to adjusting the procedures to accommodate the terms of the agreement.

d. Normally, a letter of agreement is an agreement between two or more ATC facilities. Unless AVN-100 is a party to the agreement, it is not a signatory and does not approve or disapprove the agreement.

203. AIRPORT LIGHTING AND VISUAL AIDS.

a. Operation of airport lighting and visual aids is contained in Orders:

(1) 7110.10, Flight Services.

(2) 7110.65, Air Traffic Control.

(3) 7210.3, Facility Operation and Administration.

b. Installation criteria are contained in Order 6850.2, Visual Guidance Lighting Systems.

c. Refer to appendix 1, Flight Procedures References, for other applicable orders and advisory circulars.

SECTION 2. AERONAUTICAL CHARTS

204. USE OF MAPS AND CHARTS.

a. AVN-100 should maintain an adequate supply of current charts to support the development of instrument procedures within its area of responsibility. For manual application, the largest scale charts available should be used to develop final, circling, and the first part of the missed approach segment. For precision approach procedures, the Airport Obstruction Chart (OC), a WAAS precision survey, or an equivalent plan and profile chart, is recommended for use. For all approach procedures, the 7 1/2 and 15 minute quadrangle topographic charts (Quads) produced by the U.S. Geological Survey provide excellent source for determining terrain elevation. For efficiency in procedure design and flight inspection, 1:100,000 scale planimetric/topographical (topo) charts are also authorized. Use other data sources such as IAPA, AMIS, Quarterly Obstacle Memo, Digital Terrain Elevation Data (DTED), Digital Elevation Model (DEM), etc., in addition to on-site obstacle assessment evaluations, where necessary. The Sectional Aeronautical Chart (scale 1:500,000) and the VFR Terminal Area Chart (scale 1:250,000) are good supporting source documents; however, they may not depict all current information because of the extended charting cycle.

b. Charting requirements for inclusion in a flight inspection package should be determined from the Flight Inspection Policy and Standards Branch (AVN-230). See FAA Order 8200.1, United States Standard Flight Inspection Manual, paragraph 214.2.

205. AERONAUTICAL CHARTS AND PUBLICATIONS.

a. Aeronautical charts used for air navigation are generally of two groups: VFR charts and IFR charts. The VFR charts are the Sectional and VFR Terminal Area charts and the visual navigation chart. IFR charts are the En Route Low and High Altitude, Area, Instrument Approach Procedure, DP/SID, and STAR charts.

b. The primary publication which contains basic flight information related to instrument operations in the NAS is the Aeronautical Information Manual (AIM). The primary publication serving as a preflight and planning guide for use by U. S. nonscheduled operators, business, and private aviators flying outside of the United States is the Aeronautical Information Publication (AIP). AFS-420 personnel should conduct surveillance of the AIM and AIP to verify the accuracy and appropriateness of the information therein.

c. AVN-100 personnel should monitor charts or publications released by FAA which provide informative material, recommended or mandatory, to determine that safe operating practices and conditions are accurately described for aviation users.

d. AVN-100 is responsible for the accuracy and completeness of flight data submitted by that office for publication. Procedure specialists should review the resulting NOS charts to ensure correct portrayal. AVN-100 serves as the focal point for questions about the data published on these charts.

e. Any FAA personnel, who find or are notified of discrepancies and/or errors in aeronautical charts, the AIM, or AIP, should forward the information to AFS-420, or the NFDC.

SECTION 3. ENVIRONMENTAL REQUIREMENTS

206. NOISE ABATEMENT.

The establishment of noise abatement procedures is the responsibility of Air Traffic Service. However, the Flight Standards Service has an input from an aircraft operational standpoint. These procedures should be coordinated between the appropriate regional FSD and the regional FPO. The regional FSD shall review noise abatement procedures for aircraft performance characteristics and operational safety considerations. The regional FPO shall review these procedures for practicality and adherence with applicable criteria, and has the primary responsibility for resolving conflicts between IFR procedures and existing or proposed noise abatement procedures.

207. ENVIRONMENTAL IMPACTS.

FAA Order 1050.1, Policies and Procedures for Considering Environmental Impacts, describes the requirements for documentation of environmental impact or lack of impact concerning actions taken by regional FPO's. In particular, appendix 4 of the document defines actions that require an environmental assessment or a declaration of categorical exclusion. [See also paragraph 800.] AVN will normally act as responsible federal official (RFO) for all AVN and non-AVN developed procedures. In such capacity, AVN shall apply national environmental standards and policies. However, AFS reserves the right to act as RFO for selected non-AVN developed procedures.

SECTION 4. FACILITY UTILIZATION AND MONITORING

208. FREQUENCY SERVICE VOLUMES.

In establishing instrument flight procedures, consideration must be given to the type of navigation facilities available and to their limitations.

a. All electronic navigation facilities are installed in accordance with frequency separation specified in distances and altitudes. Specific frequency protected service volumes are contained in Order 6050.32, Spectrum Management Regulations and Procedures Manual. This order is primarily used by the Regional Frequency Management Officer (FMO). AVN-100 should maintain a copy of Order 6050.32 on file to facilitate understanding and coordination of operational considerations associated with expanded service volumes.

b. Operational service volume includes the standard service volume (SSV) and expanded service volumes (ESV's). The operational service volume shall not extend outside the frequency protected service volume on any radial, at any distance, or at any altitude.

209. ATC USABLE DISTANCE AND ALTITUDE LIMITATIONS.

When flight procedures are developed which reach outside of the standard service volumes listed below, the submission and processing of an FAA Form 6050-4, Expanded Service Volume Request, is mandatory. Flight check measurements shall not be used as a substitute for an approved ESV. See figures 2-1, 2-2, and 2-3.

a. VOR/VORTAC/TACAN

Facility Class	Usable Height Above Facility	Usable Distance (Miles)
T	12,000 and below	25
L	18,000 and below	40
H	60,000-45,000	100
	Below 45,000-18,000	130
	Below 18,000-14,500	100
	Below 14,500	40

NOTE: All elevations shown are with respect to the station's site elevation.

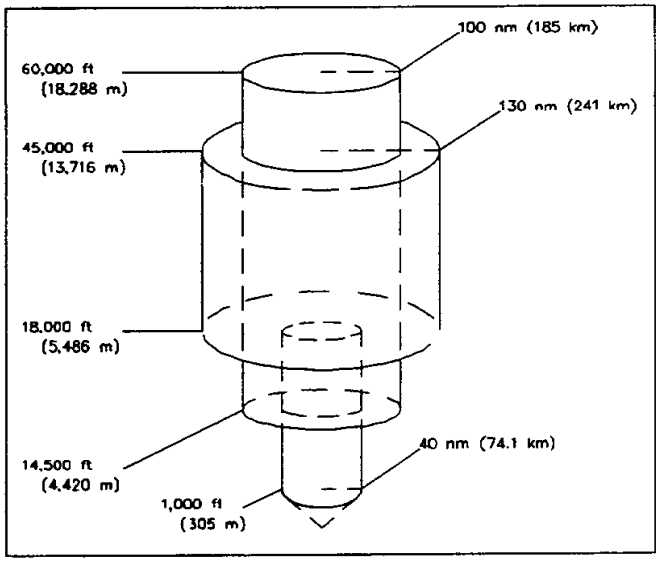


Figure 2-1. STANDARD CLASS L/H SERVICE VOLUME

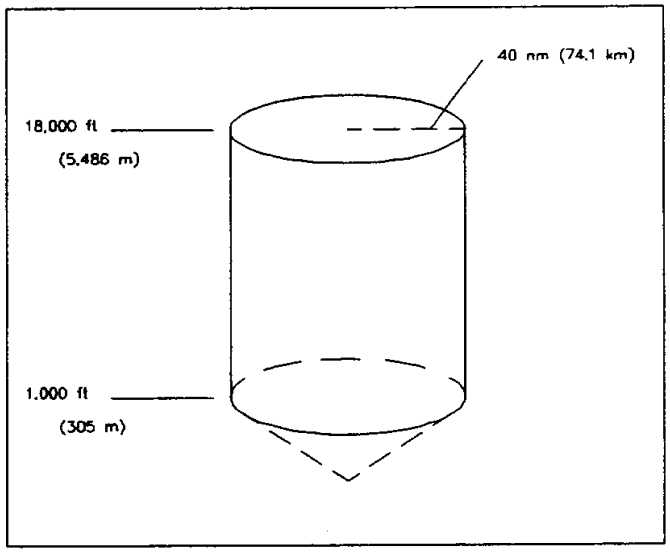


Figure 2-2. STANDARD LOW ALTITUDE SERVICE VOLUME

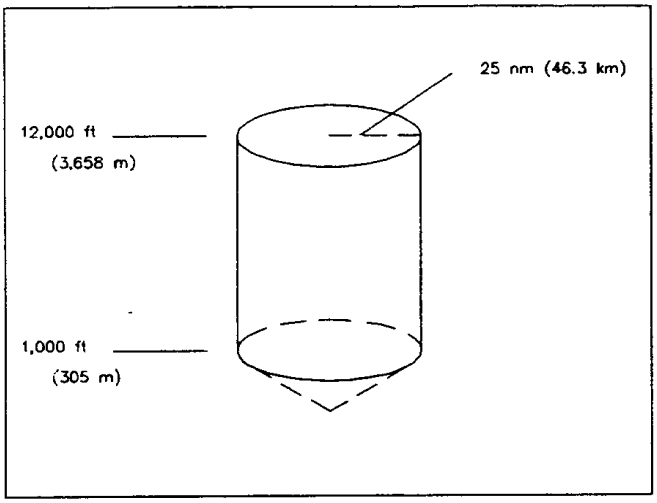


Figure 2-3. STANDARD TERMINAL SERVICE VOLUME

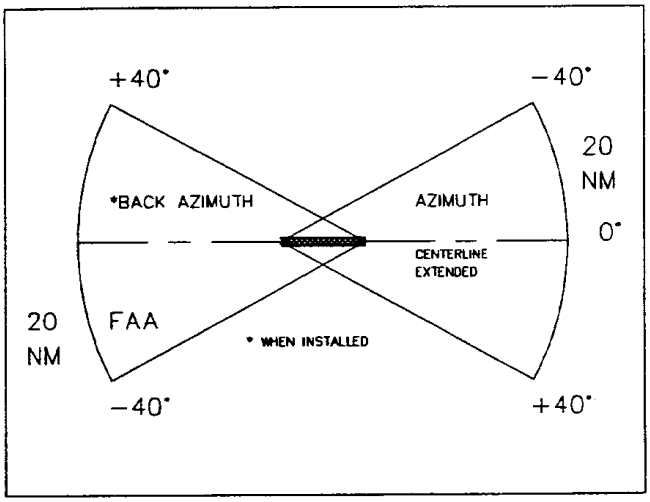


Figure 2-4. MLS AZIMUTH COVERAGE

b. NDB

Facility Class		Distance (Miles)
COMLO	NOTE: Low frequency	15
MH	beacons have no	25
H	standard height	50
HH	limitations.	75

c. ILS

Facility	Height Above Facility	Distance (Miles)
Localizer (FC)	4,500 and below	18
Localizer (BC)	4,500 and below	18
Glide Slope (2°-4°)	varies with angle	10

d. MLS

Facility	Height Above Facility	Distance (Miles)
MLS (FC)	20,000 and below	20
MLS (Back AZ)	5,000 and below	20
MLS EL	20,000 and below	20

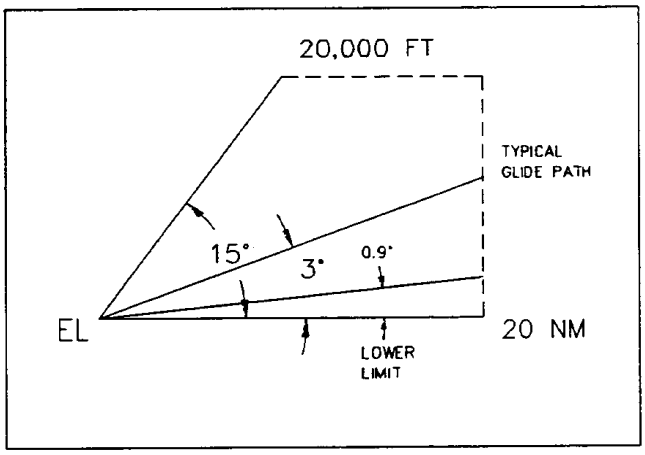


Figure 2-5. MLS ELEVATION COVERAGE

210. REQUESTS FOR EXPANDED SERVICE VOLUMES (ESV).

a. When ATC requires use of NAVAID's beyond limitations cited in paragraphs 209a through 209d, ATC submits an ESV request, with a description of the flight procedure requiring it. This request is first reviewed by the FMO. The FMO applies the criteria contained in Order 6050.32. If the FMO disapproves the request, it is returned to the originator without further action. FMO approved or restricted ESV's are then reviewed by AVN-100.

b. The National Flight Procedures Office is responsible for accuracy, clarity, and practicality of the data. If the ESV request is unclear, or if the FMO approved request has restrictions or restrictive comments, it may be necessary to coordinate changes with the FMO and/or the originating office. FAA flight inspection determines if the facility supports the procedure. The flight inspector may utilize facility files and approve the ESV based on supporting data, providing the data was taken within the last five years. If sufficient data are not available, accomplish a flight check of the procedure before AVN-100 approval.

c. A requirement for an ESV may be determined by the procedures specialist when developing an instrument procedure; e.g., the instrument procedure is proposed beyond SSV. In this case, the procedures specialist processes an FAA Form 6050-4 to obtain FMO and, in turn, flight inspection approval. An ESV request shall not be used as a substitute for proper instrument procedure design.

d. Facility rotation due to magnetic variation change should have no effect on coverage; however, radials used will change. AVN-100 initiates a revised FAA Form 6050-4 and explains the action in the REMARKS box of Part III; e.g., **"R-035 changed to R-038 due to variation change to 23E/85 effective 4 AUG 83."**

e. Describe holding patterns by an arc and two radials (e.g., **306-322°, 83 NM**) which enclose the holding pattern.

f. Preparation. Instructions for preparation of an ESV request are in paragraph 902. Figure 9-2 is a sample request.

g. Distribution. The FAA Form 6050-4 is supplied in 6-sheet sets. See paragraph 902e for specific distribution instructions.

h. AVN-100 Periodic Review. Review ESV's biennially.

211. UTILIZATION OF LOCALIZERS AS EN ROUTE AIDS.

The use of a localizer in en route flight procedures may be authorized in accordance with the following limitations:

a. The use of the localizer for course guidance shall start and end at an approved navigational fix.

b. The use of localizers for en route instrument flight procedures shall be limited to those instances where it is essential to air traffic control.

c. Appropriate navigational aids will be recommended at the earliest possible date in order to discontinue the use of the localizer for course guidance in the en route environment.

212. MONITORING OF NAVIGATION FACILITIES.

a. Monitors. It is FAA policy to provide a monitoring system for all electronic navigation facilities used in support of instrument flight procedures. Internal monitoring is provided at the facility, through the use of executive monitoring equipment which causes a facility shutdown when performance deteriorates below established tolerances. A remote status indicator may also be provided through the use of a signal sampling receiver, microwave link, or telephone circuit. VOR, VORTAC, and ILS facilities as well as new NDB's and marker beacons, installed by the FAA, are provided with an internal monitoring feature. Older FAA NDB's and some nonfederal NDB's do not have the internal feature and monitoring is accomplished by other means.

b. Monitoring Categories. Navigational facilities are classified in accordance with the manner in which they are monitored.

(1) Category 1. Internal monitoring plus a status indicator installed at control point. (Reverts to a temporary Category 3 status when the control point is unmanned.)

(2) Category 2. Internal monitoring with status indicator at control point inoperative, but pilot reports indicate facility is operating normally. (This is a temporary situation that requires no procedural action.)

(3) **Category 3.** Internal monitoring only. Status indicator is not installed at control point.

(4) **Category 4.** Internal monitor not installed. Remote status indicator provided at control point. This category is applicable only to nondirectional beacons.

213. UTILIZATION OF MONITORING CATEGORIES.

a. Category 1 facilities may be used for instrument flight procedures without limitation.

b. Category 2 is a temporary condition not considered in procedures development. ATC is responsible for issuing NOTAM's on these out of service facilities when pilot reports indicate facility malfunction.

c. Category 3 facilities may be used in accordance with the following limitations:

(1) **Alternate minimums** shall not be authorized if facility provides final approach course guidance; is required for procedure entry; is used to define the FAF; or is used to provide missed approach guidance. See also paragraph 812b.

(2) **When a facility is used to designate a stepdown fix,** alternate minimums shall be no lower than the circling minimums required without the stepdown fix.

(3) **Consider denying or adjusting terminal routes** that require reception of succeeding Category 3 facilities to avoid obstacles.

(4) **Dogleg airways or routes** shall not be predicated on these facilities.

(5) **Navigational fixes** developed from crossing radials of Category 3 facilities shall not be used to break a minimum en route altitude (MEA) to a higher MEA. (Can be used as a break to a lower MEA).

d. Category 4 facilities may be used in accordance with the following limitations:

(1) **Alternate minimums** may be authorized when the remote status indicator is located in an FAA ATC facility, and then only during periods the control point is attended.

(2) **If the control point is other than an FAA facility,** a written agreement shall exist whereby an ATC facility is notified of indicated changes in facility status.

NOTE: Failure of this Category 4 status indicator or closure of the control point will render the facility and the approach procedure unusable during the outage.

214. UTILIZATION OF 75 Mhz MARKERS.

75 Mhz markers may be utilized as the sole source of identification with the following limitations:

a. Missed Approach Point. Markers may be authorized as missed approach points for nonprecision approaches, provided a remote status indicator (RSI) is installed at an ATC facility.

b. Final Approach Fix. As a nonprecision final approach fix, the marker shall be monitored if alternate minimums are authorized. The marker need not have an RSI if collocated with a compass locator with a remote status indicator.

c. Course Reversals. Procedure turns and holding shall not be authorized from a 75 MHz marker.

d. Breaks in MEA's. Fan markers shall NOT be used to define the point where an en route climb to a higher altitude is required. (May be used as a break to a lower altitude.)

SECTION 5. IMPLEMENTING EPOCH YEAR MAGNETIC VARIATION (MV)

215. GENERAL.

This section establishes the MV program, identifies participating offices, assigns responsibilities, and provides guidelines for accomplishing the tasks necessary for implementing, maintaining, and systematically updating Epoch Year Magnetic Variation Values.

a. Background. The magnetic variation is determined by the National Oceanic and Atmospheric Administration (NOAA) for all areas of the United States and its territories for application to navigation charts and maps. Changing values for MV are tabulated and published on a 5-year epoch basis; e.g., 85, 90, 00, 05, etc. In order to assist in stabilizing the National Airspace System (NAS), a fixed value of MV is assigned to each navigational aid and airport as the magnetic Variation of Record. This value is applied to true directions to obtain the magnetic values for radials, courses, bearings, and headings published in instrument flight procedures. Periodic updating of the MV assigned to navigation facilities is required to maintain reasonable proximity of alignment with the earth's ever-changing magnetic field.

b. Participating Offices. Management and control of Epoch Year MV values require action by the following offices:

(1) National Ocean Service (NOS)

(2) Aviation System Standards (AVN)

(3) National Flight Data Center (NFDC)

(4) Regional Airway Facilities Divisions

(5) Regional Airports Divisions

(6) Military Organizations

216. RESPONSIBILITIES.

a. NOS.

(1) Publish isotonic lines or segments thereof on appropriate aeronautical charts based on current Epoch Year values.

(2) Revise en route aeronautical charts to reflect revised MV assignments to navigation facilities in accordance with information published in the National Flight Data Digest (NFDD).

b. AVN.

(1) Function as the focal point for all information relating to application of MV to the following elements of the NAS: navigational aids, airports, and instrument flight procedures; and for coordination and liaison between AVN and the Regional Airports, Air Traffic, and Airway Facilities Divisions with respect to matters pertaining to change in navigational aid or airport MV of Record and its effect on instrument flight procedures.

(2) Function as the focal point for facility flight inspection requirements and coordination. Terminal facilities (other than VOR, VOR/DME, TACAN, VORTAC, and radar systems) do not require flight inspection of MV changes.

(3) Determine whether NOTAM action is necessary when required procedural adjustment action or MV change is not accomplished by the effective date of amended instrument procedures or revised en route charts.

(4) Assign and maintain MV's of record for navigational facilities (including military facilities) and airports in whole degree increments. MV's of record are available in the AMIS facility data base. For new or relocated facilities, and for new or revised instrument procedures, apply the appropriate MV. Analyze each facility identified as a candidate for revised MV assignment to determine if facility rotation and/or redesignation of radials is required.

(5) Develop and maintain an official listing/record of navigational aids and airports by geographical location at the end of each Epoch Year to indicate the currently assigned MV of record, the

most recent Epoch Year's MV, and the projected MV for the next Epoch Year. For the purpose of planning and implementation, maintain a current listing of those candidate navigational aids and airports with a difference of 2° or more between the MV of record and the nearest future Epoch Year value.

(6) **Notify NFDC of changes** to assigned MV and the effective date of those changes for publication in the NFDD; notify other concerned offices having related responsibilities to ensure timely implementation of necessary actions. The effective date selected shall allow sufficient time for procedures processing in accordance with established schedules. MV changes which affect only terminal instrument procedures may have an effective date concurrent with publication of a specific procedural amendment.

(7) **Amend instrument flight procedures** as required, predicated on navigational aids or airports undergoing a change of MV of record. Conduct a thorough survey to determine the full impact the MV change will have on any instrument procedure. Such surveys shall include high and low altitude airways/jet routes, direct routes, air carrier off-airway routes, fixes in both high and low altitude structures, terminal routes and fixes, departure procedures (DP's), SID's, STAR's, and any other application to instrument flight procedures. Use the MV of record (or as officially changed) to develop instrument flight procedures - regardless of the MV shown on the chart being used.

(8) **VOR, VOR/DME, and VORTAC** facilities supporting the en route structure (which may or may not have instrument procedures predicated on them):

(a) Modify all fixes and IAP's. Modify all 14 CFR Part 95 Direct and Off-Airway (Non-Part 95) routes with documented radial(s) or bearing(s). Change ESV's. Make all modifications to meet an effective date that coincides with the en route change cycle.

NOTE: A listing of affected fixes, holding patterns, DP's, SID's, STAR's, military training routes, preferred routes, and ATS routes may be obtained from NFDC (ATA-110).

(b) Coordinate changes with ATC (ARTCC and approach control) in an attempt to eliminate routes, fixes, and instrument procedures that are no longer required.

(9) **Navigational aids** NOT supporting en route structure:

(a) Initiate implementation of the nearest future Epoch Year MV whenever any instrument procedure is established or amended. The nearest future Epoch Year MV will become effective concurrent with publication of the amendment (see paragraphs 816n and 816o).

(b) Amend and process multiple instrument procedures to simultaneously become effective concurrent with the instrument procedure specified in the MV change notification to NFDC.

(c) Submit revisions of all affected fixes with the instrument procedure(s). Change ESV's.

(d) Amend radar and DF procedures when airport MV of record is changed. If the DF is located at an off-airport site, obtain the MV for the antenna site; include MV and Epoch Year in the lower right corner of the FAA Form 8260-10. See chapter 4, section 5.

(10) **Military facilities.**

(a) Accomplish MV changes for U.S. Army facilities in the same manner as for civil facilities; however, obtain the installation commander's prior approval.

(b) Notify the appropriate military representatives when the need to change the MV of other military facilities is identified.

(11) **Airports.**

(a) Amend IAP's, SID's, and DP's which specify runway designator numbers affected by MV change.

(b) Notify the regional 530 office of the need for amendment action if STAR's contain runway designator numbers affected by MV change.

(c) Take appropriate NOTAM action if repainting of an affected runway is not accomplished on the required date.

c. **NFDC.** Upon notification by AVN of any change to MV of record, publish a notice of change in the NFDD to indicate the effective date of such change.

d. **Regional Airway Facilities Division.** Coordinate with AVN to obtain the MV of record for assignment to newly installed or relocated navigational aids.

e. **Regional Airports Division.** Coordinate with AVN-160 prior to establishing or revising runway designator numbers for an airport having one or more instrument approach or departure procedures, to determine the MV to be applied to the runway true bearing. Determination of the runway designator number should be a matter of joint agreement with AVN, and be accomplished sufficiently in advance to allow for procedural amendments.

f. **Military organizations.** Contact AVN-160 to obtain the MV of record to be applied to navigational aids or airports under military jurisdiction.

217. GUIDELINES. The identification and selection of navigational aids or airports as candidates for revision of MV of record require careful consideration and evaluation of a number of factors - as the impact of MV changes can be considerable. Air Traffic Division may have to initiate or revise published air traffic procedures; Airway Facilities is directly involved in facility rotations and requires proper coordination. The Airports Division may have to arrange for repainting of runway designator numbers.

NOTE: Airport standards require renumbering when the runway designator number is more than 6° from the magnetic alignment. This is usually accomplished during the next routine repainting, or when the existing markings are obliterated by seal coats, overlays, or reconstruction.

a. **MV versus Epoch Year Value.** When the difference between the MV of Record and the nearest future Epoch Year value of any navigational aid or airport is 3° or more, the MV of record shall be changed to the nearest future Epoch Year value. When the difference is less than 3°, AVN shall consider implementing the nearest future Epoch Year value when workload permits. Factors to consider include whether the navigational aid is isolated or in close proximity to one or more other facilities, whether on airport or away from an airport, and the impact on instrument flight procedures.

b. **Facilities on airports.** At airports with localizer(s) or more than one navigational aid, the MV at the airport reference point (ARP) shall be designated and assigned to all facilities at that airport, including all components of the ILS.

c. **MV versus OC Chart Value.** Where the assigned MV of record differs from the MV shown on the Obstruction Chart (OC), the assigned MV of record shall be used in the development of instrument flight procedures.

d. **Runway bearing** shall be assigned the same MV as the airport.

e. At **major airport** terminal areas, the ARP MV of record at the designated controlling airport may be used in determining the MV applied to all navigational aids serving the terminal areas.

218-219. RESERVED.

SECTION 6. NOTICES TO AIRMEN (NOTAM)

220. GENERAL.

NOTAM's provide timely knowledge to airmen, and other aviation interests, of information or conditions which are essential to safety of flight. NOTAM's pertaining to instrument procedures remain in effect until the pertinent charts and publications are amended or the condition requiring the NOTAM ends. This section deals primarily with procedures for issuing Flight Data Center (FDC) NOTAM's which are required to maintain the accuracy and currency of charted terminal and en route flight procedures.

221. NATIONAL NOTICE TO AIRMEN SYSTEM.

A National Notice to Airmen System has been established to provide airmen with the current status of the National Airspace System (NAS). Details for handling this information are contained in Order 7930.2, Notices to Airmen. The following is a brief summary of the services provided:

a. FDC NOTAM's pertaining to instrument flight procedures are issued through the National Flight Data Center (NFDC) and are primarily used to disseminate safety of flight information relating to regulatory material. They may also be used to provide wide dissemination for flight procedures data, aeronautical information, and other time-critical information. They are numbered by the U.S. NOTAM Office (USNOF) to reflect the year of issuance and the sequence number for the calendar year, (e.g., 8/0445). FDC NOTAM's are transmitted on all Service A circuits, and stored in the Consolidated NOTAM System, after which they are entered in the Notices to Airmen Publication (NTAP), also referred to as the "Class II (mail distribution) publication" until canceled.

b. D NOTAM's issued under the Flight Service Stations' Accountability System receive the same dissemination as the surface weather report for the originating station, and provide the user with current information on an hourly basis. They are numbered to reflect the month of issuance and the sequence number of the month, (e.g. 6/18).

222. FDC NOTAM TYPES.

Changes to instrument flight procedures, which have been charted and distributed, may be processed as FDC NOTAM's and issued through NFDC. Procedural minimums shall not be lowered by NOTAM unless fully justified as a safety of flight issue. In order to identify procedural amendments that can be charted from the NOTAM information, AVN-100 personnel shall prefix the text with an action code as follows:

a. FI/P (Flight Information/Permanent). This prefix shall be used when the amended procedure is expected to be effective for more than 4 charting cycles (224 days). FI/P-NOTAM's (P-NOTAM's) contain information that is complete for charting purposes. Cartographic agencies will initiate immediate changes to charted information, based upon the P-NOTAM data, prior to receiving from NFDC the formal amendment to the appropriate procedure. Only one SIAP shall be addressed per P-NOTAM. P-NOTAM's may NOT be used for Airway changes. Refer to paragraphs 224b, c, and d for DP and STAR NOTAM procedures.

FI/P-NOTAM's may be used to amend procedures without a complete review of the procedure. The amendment will be indicated by an alphanumeric identifier; e.g., Amdt 3A, Amdt 4C, etc. A hard copy of each P-NOTAM shall be affixed to the current amendment and maintained in the procedures file by both the NFDC and AVN-100, for each SIAP until the next full amendment is effective.

b. FI/T (Flight Information/Temporary). Use this prefix when the amended procedure will be effective for less than 4 charting cycles (224 days). If, at any time, it is determined that the condition is expected to last longer or will become permanent, amend the procedure via an FI/P-NOTAM or revised 8260-series form. The P-NOTAM or 8260-series form should be submitted prior to the expiration of the temporary timeframe.

223. FDC NOTAM PREPARATION, REVIEW AND TRANSMITTAL.

a. AVN-100 is responsible for formulating procedural and airway FDC NOTAM's and forwarding them for transmittal. The following procedures apply:

(1) Coordinate all FDC NOTAM's with the affected ARTCC facility and the appropriate regional offices at the time of submission, or if unable, during the next normal workday (See also Order 8260.3, paragraph 150). Normally, AVN-100 should also notify the airport manager at the affected location.

NOTE: The ARTCC will ensure that the NOTAM's are forwarded to all affected ATC facilities under Order 7930.2F, paragraph 2-2-3.

(2) AVN-100 shall establish procedures to ensure that *all* NOTAM's are reviewed for accuracy, completeness, content, etc. prior to submission.

(3) Call NFDC to ensure a specialist is available to receive the NOTAM Once assured, submit NOTAM's to the NFDC via facsimile (FAX). A typewritten or legible handwritten copy is required; however, a telephone call is acceptable in emergencies. A record of a successful FAX transmittal after the phone call assures receipt.

(4) During periods when NFDC is closed or a specialist cannot be contacted, FAX the NOTAM directly to the USNOF. The NOTAM originator is responsible for ensuring USNOF receipt.

(5) Ensure that a copy of all FDC NOTAM's sent directly to the USNOF is clearly annotated that it has been sent directly to the USNOF and also sent to NFDC via FAX at the time of transmittal. This will preclude duplication and confusion.

b. NFDC is responsible for reviewing applicable FDC NOTAM's for accuracy, format, completeness, and data base agreement prior to forwarding them to the USNOF for transmittal. Discrepancies noted by NFDC will be resolved through the originating AVN-100 branch. NFDC is also responsible for compiling NOTAM's for inclusion in the Notices to Airmen Publication (NTAP) and follow up actions noted in paragraph 227.

c. The USNOF is also responsible for ensuring that FDC NOTAM's are in the proper format under this directive and Order 7930.2. Questions/ discrepancies will be addressed to the submitting agency, NFDC, or AVN-160 as appropriate. FDC NOTAM's affecting FAA developed military SIAP's at civil locations shall be issued separately and forwarded to the USNOF military representative.

d. Cartographic Standards Branch, ATA-130, is responsible for issuing, tracking, and canceling FDC NOTAM's used to correct/amend U.S. government IFR en route and VFR sectional aeronautical charts when necessary to resolve charting errors.

224. INSTRUMENT PROCEDURE NOTAM's.

a. A complete review and a new amendment are the preferred methodology for permanent procedure changes, particularly when applying new or revised TERPS criteria. However, it is recognized that this may not always be possible due to workload, staffing level, etc. P-NOTAM's have proven to be an effective means of updating aeronautical charts within the following guidelines:

(1) There is no age limit on a SIAP submitted for P-NOTAM amendment as long as AVN-100 reviews it and ascertains that there are no other safety of flight changes required to the procedure. Do NOT prepare a NOTAM solely to address minor non-safety related discrepancies to a SIAP; however, if a NOTAM is required for safety reasons, other items may be included in the P-NOTAM to simultaneously update procedure charts.

(2) AVN-100 may issue P-NOTAM's for consecutive amendments to the same procedure. All P-NOTAM amendments shall be sequentially lettered (e.g., Amendment 13A, 13B, 13C, etc.) as a suffix to the current amendment.

(3) Exercise caution in adding P-NOTAM's to a procedure or when initiating a P-NOTAM when there is a current T-NOTAM in effect for the procedure. In many cases close follow-up action, including canceling and reissuing NOTAM's, will be necessary to ensure there is no confusion for pilots and chart producers.

Examples:

The currently published SIAP is AMDT 3. There is a T-NOTAM in effect for AMDT 3 that will remain in effect after AMDT 3A is charted. When AMDT 3A is charted, the T-NOTAM must be canceled and reissued for AMDT 3A.

The currently published SIAP is AMDT 4A. A P-NOTAM has been issued, but not yet charted promulgating AMDT 4B. Another P-NOTAM is required that will promulgate AMDT 4C. In this case, because AMDT 4B is not yet charted, issue a T-NOTAM against the currently charted procedure (AMDT 4A). When AMDT 4B is charted, cancel the T-NOTAM and reissue it as a P-NOTAM promulgating AMDT 4C.

(4) Issue a T-NOTAM and amend the SIAP as a priority to the AVN-100 work schedule, when all changes and corrections cannot be accommodated using a P-NOTAM.

(5) When changes to civil procedures also affect FAA-developed military procedures at civil or joint-use airfields, AVN-100 shall issue a separate FDC NOTAM for the military procedure as specified in Orders 8260.15, United States Army Terminal Instrument Procedures Service, and 8260.32, United States Air Force Terminal Instrument Procedures Service. AVN-100 shall request the USNOF to forward the civil NOTAM and the reason to the cognizant military authority for appropriate military NOTAM action.

(6) NOTAM requirements for FAA developed U.S. Army procedures at military airfields will be processed under Order 8260.15.

b. Changes to textual DP's shall be issued under the FDC NOTAM process as outlined under paragraph 223. Only FI/T-NOTAM's may be issued. Permanent procedural changes to textual DP's must be made via a new or amended Form 8260-15A within 224 days of the issuance of the associated NOTAM.

c. Changes to graphic DP's (formerly SID's) shall be promulgated as NOTAM (D)'s under Order 7930.2. These NOTAM's are developed by AVN-100 and are issued by the USNOF using the accountability code "USD." The following format examples are provided:

USD 12/001 SAN BORDER THREE DEPARTURE JULIAN TRANSITION: FROM OVER BROWS INT VIA JLI R-182 TO JLI VORTAC.

USD XX/XXX LAX CHATY TWO DEPARTURE, GORMAN TRANSITION: MINIMUM ALTITUDE BROWS, INT TO GMN VORTAC, 8000 FT.

In the first example above, "USD" is the NOTAM accountability code; "12/001" is the NOTAM number which is assigned by the USNOF (first NOTAM (D) issued in December); "SAN" indicates the three-letter airport identifier; the remainder is the NOTAM text.

(1) The following procedures shall be followed when a NOTAM (D) for a DP is required:

(a) AVN-100 shall forward the NOTAM text directly to the USNOF via facsimile for transmittal.

(b) For multiple airport DP's, a separate NOTAM (D) must be prepared for each airport affected by the DP.

(c) Temporary and permanent conditions may be promulgated via the NOTAM (D) process; however, NOTAM (D)'s shall not be used as a source to effect charting changes. Permanent procedural changes to graphic DP's must be made via a new or amended FAA Form 8260-15B within 224 days of the issuance of the associated NOTAM (D).

(d) The USNOF shall review each NOTAM to ensure formatting, contractions, etc. are correct and assign the NOTAM number. Questionable items must be resolved with the originator prior to issuance.

(e) Once issued, AVN-100 shall be responsible for obtaining the NOTAM number from the USNOF, tracking, and canceling the NOTAM when the condition requiring the NOTAM is no longer applicable.

d. Changes to STAR's requiring NOTAM action are also promulgated as NOTAM (D)'s. The appropriate ARTCC retains the responsibility for initiating, tracking, and canceling NOTAM (D)'s for STAR's.

e. General NOTAM (D) Actions.

(1) When a NOTAM (D) is issued closing an airport permanently, an FDC NOTAM need not be issued denying use of a SIAP. A routine procedure cancellation should be processed.

(2) When a NOTAM (D) is issued to shut down a facility permanently, only routine cancellation of procedures predicated on that facility are required. FDC NOTAM's may be required for other procedures supported by the affected facility.

(3) When a NOTAM (D) is issued closing a runway, an FDC NOTAM need not be issued denying straight-in minimums to that runway. If the closing is permanent, routine procedure cancellations, including takeoff/departure procedures, shall be processed.

(4) When a NOTAM (D) is issued for a facility shutdown or outage, an FDC NOTAM denying SIAP use is not required for those SIAP's using only that facility. However, other SIAP's in the vicinity must be reviewed to determine if that facility supports courses or fixes; in such cases, those SIAP's require an FDC NOTAM. Particular attention must be given to fixes supporting stepdown minimums and missed approach procedures which are predicated on the out-of-service facility. It is not necessary to issue NOTAM's for fixes and terminal route segments which are related to unusable airway segments from the subject facility. Do not issue "Radar Required" NOTAM's on unusable or restricted airway segments (see also paragraph 463).

When an instrument approach procedure is NOTAMed for an outage of an NDB or DME facility providing ancillary support, (not providing final approach course guidance), exempt aircraft equipped with IFR GPS systems from the restriction. For clarification, state the reason for the restriction in the text of the NOTAM. An example for use when a DME antenna is out of service: 'DME MINIMUMS NA EXCEPT FOR IFR GPS-EQUIPPED AIRCRAFT, ORD DME OTS." An example of an ILS approach that uses an LOM for procedure entry and/or missed approach clearance limit: 'PROCEDURE NA EXCEPT FOR IFR GPS-EQUIPPED AIRCRAFT, FOR LOM OTS."

(5) When a NOTAM (D) removes a localizer from service, the SIAP is unusable. If the GS is out, the precision approach is unusable. If other ILS components are out, the inoperative table applies.

(6) When radio control of approach lights or runway lights is commissioned or the frequency is changed, Flight Inspection issues a NOTAM (D) in accordance with Order 8200.1, United States Standard Flight Inspection Manual.

225. AIRWAY NOTAM's.

When a restriction or a change to an airway requires a NOTAM, forward an FDC T-NOTAM to NFDC following the procedures in paragraph 223. NOTAM's, reflecting airway changes within one or more ARTCC's airspace, are issued under the affected ARTCC identifier as Center Area NOTAM (CAN) FDC NOTAM's on the NOTAM circuit.

a. Airway changes involving a single state and one or more ARTCC's shall be issued with the ARTCC identifier followed by the two-letter state code. The two-letter state code must also follow all NAVAID and fix designators.

Example:

"FDC 8/0001 ZFW OK FI/T AIRWAY ZFW ZKC. V140 SAYRE (SYO) VORTAC, OK TO TULSA (TUL) VORTAC, OK MEA 4300.

FDC 8/0002 ZKC OK FI/T AIRWAY ZFW ZKC. V140 SAYRE (SYO) VORTAC, OK TO TULSA (TUL) VORTAC, OK MEA 4300.

REASON: TEMPORARY NEW TOWER. OE 98-ASW-0123."

b. If the airway NOTAM affects one but less than four ARTCC's and multiple states, issue one NOTAM for each affected ARTCC. If the NOTAM affects four or more ARTCC's, send one NOTAM using FDC as the facility identifier.

c. If the restriction will exceed the time limit established in paragraph 222b, forward an updated FAA Form 8260-16 and/or 8260-2 simultaneously to NFDC for charting.

Examples:

<u>One ARTCC:</u>

"FDC 8/0011 ZBW CT FI/T AIRWAY ZBW. V1 HARTFORD (HFD) VORTAC, CT TO MADISON (MAD) VOR/DME, CT MEA 3000.

REASON: TEMPORARY NEW TOWER. OE 98-ANE-1329."

Two ARTCC's:

"FDC 8/0011 ZBW FI/T AIRWAY ZBW ZNY. V1 HARTFORD (HFD) VORTAC, CT TO DIXIE INT, NJ MEA 3000.

FDC 8/0012 ZNY FI/T AIRWAY ZBW ZNY. V1 HARTFORD (HFD) VORTAC, CT TO DIXIE INT, NJ MEA 3000.

REASON: TEMPORARY NEW TOWER. OE 98-ANE-1329."

Three ARTCC's:

"FDC 8/0011 ZBW FI/T AIRWAY ZBW ZNY ZDC. V1 HARTFORD (HFD) VORTAC, CT TO WATERLOO (ATR) VORTAC, DE MEA 3000.

FDC 8/0012 ZNY FI/T AIRWAY ZBW ZNY ZDC. V1 HARTFORD (HFD) VORTAC, CT TO WATERLOO (ATR) VORTAC, DE MEA 3000.

FDC 8/0013 ZDC FI/T AIRWAY ZBW ZNY ZDC. V1 HARTFORD (HFD) VORTAC, CT TO WATERLOO (ATR) VORTAC, DE MEA 3000.

REASON: TEMPORARY NEW TOWER. OE 98-ANE-1329."

Four or more ARTCC's:

"FDC 8/0001 FDC FI/T AIRWAY ZNY ZDC ZAT ZJX. V1 DIXIE INT, NJ TO CRAIG (CRG) VORTAC, FL MEA 4000.

REASON: TEMPORARY NEW TOWER. OE 98-ANE-1329."

226. NOTAM CONTENT.

a. FDC NOTAM's shall identify the procedure being amended and the current amendment number. The NOTAM shall be as concise as possible, and shall NOT contain information that could be published at a later date by a routine amendment. For example, changes to the touchdown zone or airport elevation, which do not affect visibility minimums, do not require NOTAM action.

b. The text shall be prepared by AVN-100 using plain language and those contractions found in the NTAP. Specialists must keep in mind that the NOTAM is directed to the pilot, and should be worded so that the intended change will not be misinterpreted. Avoid the use of internal cartographic instructions which have no meaning to pilots. Spell out NAVAID names in clear text followed by the identifier. If it appears that the NOTAM length will exceed 20 lines, refer to FAA Order 7930.2, paragraph 4-3-4.

c. For temporary obstructions, include the type, elevation, distance, and direction from the airport or runway threshold, as appropriate, as the last line of the text.

d. If the NOTAM contains permanent information for charting, the last line of the NOTAM text shall identify it as the next sequential alphanumeric amendment; i.e., ORIG A, AMDT 4B, etc. The date of the NOTAM will become the effective date of that amendment.

e. Include a reason for the NOTAM following the NOTAM text. This information will not be transmitted as a part of the NOTAM text, but will inform the NFDC and the USNOF of the basis for the NOTAM. It will also ensure the data is retained in the NOTAM historical files.

Examples:

"FDC 8/____ ELP FI/P EL PASO INTL ARPT, EL PASO, TX.
ILS RWY 22 AMDT 10...
GS 3.0 DEGREES, TCH 51, GS ALT AT LOM 5155, GS ALT AT MM 4159.
THIS IS ILS RWY 22 AMDT 10A.

REASON: 8240.47 EVALUATION OF RELOCATED GLIDE SLOPE."

"FDC 8/____ ORD FI/T CHICAGO O'HARE INTL, CHICAGO, IL.
VOR RWY 22R AMDT 8B...
MDA 1400/HAT 750, VIS 1-1/2 ALL CATS.
TEMPORARY CRANE 1100 MSL 1.2 NM SE OF RWY 23. (Specify distances less than 1 NM in feet.)

REASON: TEMPORARY CRANE FOR 90 DAYS. OE 98-AGL-1689."

**"FDC 8/____GPT FI/T GULFPORT-BILOXI REGIONAL, GULFPORT, MS.
VOR RWY 31 AMDT 18...
S-31 MDA 720/HAT 693 ALL CATS. VIS CAT C 2, CAT D 2-1/2. CIRCLING MDA 720/HAA 692 ALL CATS. VIS CAT C 2, CAT D 2-1/2.**

**RADAR 1 AMDT 3
VOR/DME OR TACAN RWY 31 ORIG...
S-31 MDA 660/HAT 633 ALL CATS. VIS CAT C 1-3/4, CAT D 2, CAT E 2-1/4. CIRCLING CATS A/B MDA 660/HAA 632.**

TEMPORARY CRANE 410 MSL 1.5 NM SE OF RWY 31.

REASON: TEMPORARY CRANE FOR 160 DAYS. OE 98-ACE-1453."

**"FDC 8/____ LAN FI/T CAPITAL CITY, LANSING, MI.
ILS RWY 10R AMDT 8A...
ILS RWY 28L AMDT 24...
VOR RWY 6 AMDT 23B...
VOR RWY 24 AMDT 7E...
RADAR-1 AMDT 13...
CIRCLING MDA 1420/HAA 559 ALL CATS.**

REASON: NEW BUILDING, 1115 MSL. OE 98-AGL-2974."

*NOTE: Since the above condition is permanent, SIAP Amendments must be processed within 224 days. However, in lieu of the above single T-*NOTAM, a *P-NOTAM could be issued for each SIAP.*

**"FDC 8/____ HPT FI/P HAMPTON MUNI, HAMPTON, IA.
VOR/DME RWY 35 ORIGA...
MSA FROM MASON CITY VORTAC 3000.
DELETE: ACTIVATE MIRL RWY 17-35, CTAF.
THIS IS VOR/DME RWY 35 ORIG B.**

**REASON: NEW TOWER, 2049 MSL, OE 97-ACE-2286. LIGHT NOTE REDUNDANT TO CHARTING.
THIS CANCELS FDC 1/2345."**

**"FDC 8/____ AXH FI/P HOUSTON-SOUTHWEST, HOUSTON, TX.
NDB RWY 28 AMDT 4...
CHANGE ALL REFERENCE TO RWY 10-28 TO RWY 9-27.
THIS IS NDB RWY 27 AMDT 4A.**

REASON: RUNWAYS RENUMBERED FOR MAGNETIC VARIATION CHANGE."

**"FDC 8/____ AXH FI/P HOUSTON-SOUTHWEST, HOUSTON, TX.
LOC/DME RWY 10 AMDT 2A...
CHANGE ALL REFERENCE TO RWY 10-28 TO RWY 9-27.
THIS IS LOC/DME RWY 9 AMDT 2B.**

REASON: RUNWAYS RENUMBERED FOR MAGNETIC VARIATION CHANGE."

227. NOTAM FOLLOW-UP ACTION.

Once a P-NOTAM has been issued, the NFDC will track the procedure change until charted. A copy of all P-NOTAM's shall be stapled to the current 8260-series forms in the procedures file for each SIAP. The NOTAM's will be promulgated to charting agencies in the bi-weekly Transmittal Letter of changes for Federal Register publication. NFDC shall review amended SIAP charts, ensure the procedural change has been charted correctly, and cancel the NOTAM on the amended procedure effective date.

228. NOTAM RESPONSIBILITY.

NOTAM follow-up services, provided by NFDC, are designed to expedite the publication of procedures amended by emergency action and to assist field personnel in the management of NOTAM issuances. Assistance in NOTAM handling by NFDC personnel in no way changes basic responsibilities for determining the need for NOTAM issuance, NOTAM content, or for the required follow-up actions. These responsibilities remain within AVN, and emergency type actions described above are not to be used as a substitute for accurate and timely program planning.

229. RESERVED.

SECTION 7. QUALITY/STANDARDIZATION OF INSTRUMENT FLIGHT PROCEDURES

230. AVN-100 ACTION.

a. AVN-100 is responsible for the accuracy of procedures it develops, and for establishing and conducting a system of quality control which ensures that such procedures conform to applicable criteria, standards, and policy.

b. AVN-100's system of quality control shall ensure that all flight procedures and NOTAM's submitted to NFDC for publication are of a professional quality that will not require corrections or changes following release.

c. When unusual circumstances exist, for which policy is not clear or is nonexistent, request a policy determination from AFS-420 PRIOR TO submission for publication. AFS-420 will issue appropriate instructions as necessary.

d. Instrument charts produced by National Ocean Service will be reviewed by AVN-100, upon receipt, for variations from information submitted for publication and for clarity of the graphic portrayal. Charting errors detected shall be forwarded directly to NFDC for corrective action. Charts which do not clearly portray the procedures should be referred to AFS-420, with recommendations for charting improvements.

231. AFS-420 ACTION.

a. AFS-420 monitors procedures and FI/T or FI/P NOTAM's on a random surveillance basis and only relative to policy compliance.

b. Preliminary reviews may be conducted by AFS-420 upon request by the AVN-100. When unusual circumstances exist, AFS-420 will issue appropriate instructions to AVN-100 as necessary.

232-239. RESERVED.

SECTION 8. PERIODIC REVIEW OF INSTRUMENT PROCEDURES

240. GENERAL.

a. This section prescribes the minimum frequency of review of instrument procedures. When deemed necessary, and in the interest of safety or for other proper justification, make more frequent reviews. Review **all** instrument procedures to **ensure** that requirements for obstacle clearance, navigational guidance, safety, and practicality are met. **Immediately** comply with changes to criteria which relate to safety of flight. Use the review to ensure compliance with all other changes to criteria. FPO's can normally present current reviews of OE's, F&E and AIP projects pertinent to the review process.

b. A review is considered complete if it occurs in the period from one month prior to one month after the month in which the review is due; e.g., if the review is due in July, the window is June 1 to August 31. If the window is met, the procedure review due month remains unchanged. However, if the review occurs outside of the specified window, the next review is due in the month in which the review was actually completed.

c. When facility restrictions are established or changed, review all **associated flight procedures.** Take particular care to evaluate unpublished procedures such as off-airway, direct, and substitute routes.

241. AVN-100 ACTION.

a. SIAP's, SID's, DP's. and STAR's:

(1) Review at least once every two years.

(2) Review all feeder, initial, intermediate, final, circling, missed approach, and departure procedure areas for any changes that would affect flight altitudes. To avoid proliferation of conflicting data on SIAP's at an airport, the periodic review should include all procedures at that airport. See paragraph 837a.

(3) Ensure that all procedures are contained within controlled airspace. Initiate airspace action as required.

(4) Ensure that minimums meet criteria. Review SIAP forms for conformance to current standards. Check published SIAP's for correct portrayal.

(5) Verify current magnetic variation values.

(6) Verify continued need for SIAP's based on usage rate, economic need, etc. Cancel SIAP's that are no longer required.

(7) Verify the validity of existing waivers. Cancel waivers no longer required.

b. Airways, Airway Segments, and Routes:

(1) Review at least once every four years.

(2) Verify controlling obstacles and assure that authorized altitudes meet obstacle clearance requirements. Use current en route charts as airway checklists.

(3) Verify continued need for off-airway and FAR Part 95 direct routes. Cancel routes that are no longer required.

c. Fixes:

(1) Review all fixes in conjunction with the associated SIAP's, airways, or routes (see section 10). Assure that FAA Form 8260-2 entries for facility type, class, monitoring category, radial/ course/bearing, distances, least divergence angle, and charting requirements are correct. Verify holding requirements and controlling obstructions.

(2) Cancel fixes and holding which are no longer needed.

d. All Procedures:

(1) Establish and maintain a system of control to assure that reviews are accomplished.

(2) Take remedial action by NOTAM or revised FAA 8260-series form.

(3) Review all associated waivers in conjunction with any procedure review.

(4) Annotate and incorporate editorial changes noted during the review in the next revision. Do NOT make SIAP amendments solely to correct an MSA altitude except when the MSA provides less than 950 feet of obstacle clearance.

242-249. RESERVED.

SECTION 9. COMMUNICATIONS AND WEATHER

250. COMMUNICATIONS REQUIREMENTS.

FAA Order 8200.1, U.S. Standard Flight Inspection Manual, section 211, defines communication tolerances and flight inspection procedures. Even though gaps in navigation course guidance may be approved, reliable communications coverage over the entire airway or route segment at minimum en route IFR altitudes shall be available.

a. MEA's or MAA's are predicated upon continuous approved communications capability for the entire designated segment. All available resources must be explored before restricting the use of altitudes of an airway or route due to a lack of acceptable communications coverage. Coordination must be effected with ATC for determination of the acceptability of communications coverage in a particular area.

b. Mandatory communications with the appropriate ARTCC are not required; communications with other ATC facilities are allowable. Where necessary, in order to provide direct communications with a center, appropriate recommendations for a peripheral site should be made.

c. Communications requirements for non-14 CFR Part 95 routes certified for a particular air carrier are the responsibility of appropriate Flight Standards District Office (FSDO) operations inspector.

251. USE OF UNICOM.

UNICOM may be used to satisfy the communications requirements of Order 8260.3, paragraph 122e; however, there are limitations on its use that must be considered. According to FCC Rules and Regulations, Part 87, Subpart C, UNICOM stations are not authorized for ATC purposes other than the relay of the following information between the pilot and controller:

a. Revision of proposed departure time.

b. Time of takeoff, arrival, or flight plan cancellation.

c. ATC clearances, PROVIDED a letter of agreement is consummated by the licensee of the advisory station (UNICOM) with the FAA.

d. Weather information - only if there is no FAA control tower or Flight Service Station, or during periods when an FAA unit is not in operation. Direct transmission of approved altimeter setting to the pilot is authorized provided the procedure states an alternate course of action if UNICOM is not contacted.

NOTE: FCC regulation places the responsibility for the letter of agreement on the licensee, but FAA Handbook 7210.3 suggests that an ATC facility prepare the agreement. A communication capability between the UNICOM station and ATC is necessary to meet requirements of Order 8260.3, paragraph 122e.

252. AUTOMATIC ALTIMETER SETTING AND WEATHER REPORTING SYSTEMS.

Approved devices for automatically reporting altimeter settings and weather may be used to satisfy the requirements of Order 8260.3, paragraph 122d. Special notes will be required on the approach charts. Examples of standard notes can be found in paragraph 814f.

253-259. RESERVED.

SECTION 10. NAVIGATIONAL FIXES

260. GENERAL.

Criteria for navigational fixes are contained in chapters 2 and 17 of Order 8260.3. When using a VORTAC, fixes should be defined by DME from the facility providing course guidance in addition to radials or course intersections.

261. REPORTING POINTS.

Reporting points are established for use by ATC in the movement and separation of aircraft. Reporting points are divided into two categories, which are:

a. Compulsory reporting points are designated by regulation and, therefore, require rule making action. It is ATC's responsibility to initiate airspace rule making action for the designation of compulsory reporting points. Unless the reporting point can be identified at the lowest operational altitude, it shall not be designated a compulsory reporting point.

b. Non-Compulsory reporting points may be established by ATC without the requirement for rule making action.

262. UNPLANNED HOLDING AT DESIGNATED REPORTING POINTS.

a. Where required for aircraft separation, ATC may request aircraft to hold at any designated reporting point in a standard holding pattern at the MEA or the minimum reception altitude (MRA), whichever altitude is the higher, at locations where a minimum holding altitude has not been requested. For this reason, the conditions to be considered for holding (obstacle clearance, communications, and facility performance) must be reviewed whenever reporting points are established or revised, even though specific holding authorization has not been requested by the ATC facility.

b. Unplanned holding at en route fixes may be expected on airway or route radials, bearings, or courses. If the fix is a facility, unplanned holding could be on any radial or bearing. Where standard holding cannot be accomplished at the MEA or MRA, any necessary limitations must be clearly indicated on FAA Form 8260-2, Radio Fix and Holding Data Record.

263. REQUESTS FOR NAVIGATIONAL FIXES.

FAA Form 8260-2 shall be used as the vehicle to transmit the ATC requests for the establishment, revision, or cancellation of navigational fixes, holding patterns, and/or reporting points. All requests from ATC facilities, civil and military, are forwarded through the appropriate ARTCC to AVN-100. AVN-100 may initiate FAA Form 8260-2 for those navigational fixes which are required for the development of SIAP's. Other operationally required navigational fixes shall be coordinated with the appropriate ATC facility.

264. NAMING NAVIGATIONAL FIXES. In order to satisfy the requirements of Flight Management System (FMS), the following applies for all procedures:

a. Name all intersections, DME fixes, ATD fixes (except final segment stepdown fixes), RNAV waypoints, starting and ending points of arc initials or feeder segments, and (except for dead-reckoning initials) points where feeder or initial routes intercept the final approach course extended prior to the initial or intermediate fix. Each name consists of a 5-letter pronounceable word. Obtain 5-letter names from NFDC. Name fixes collocated with a facility (named in accordance with Order 7400.2, chapter 3) the same as the facility.

b. Coordinate with NFDC and the appropriate ARTCC when a fix name change is required. Document the change on FAA Form 8260-2.

265. DOCUMENTING NAVIGATIONAL FIXES.

a. All named civil and military fixes shall be documented and approved on FAA Form 8260-2. Chapter 9 of this order contains instructions for entering data and submitting FAA Form 8260-2.

b. Military fixes are also maintained in the National Data Base and are used to support the air traffic system. Therefore, the requirement to document and flight inspect military fixes must receive the same priority as the fixes that support civil procedures.

266. CORRELATION OF NAVIGATIONAL FIXES AND CHANGEOVER POINTS (COPS).

The designation of navigational fixes should be directly related to COP's. Care should be taken to avoid designating navigational fixes which require the use of a facility beyond the COP. Figure 2-6 is an example of the proper and the improper method of designating a navigational fix in relation to COP's.

NOTE. These diagrams illustrate a problem encountered when handling intersections and changeovers. Make certain the entire complex is reviewed to prevent establishing procedures which are in conflict with the usability of the facilities involved.

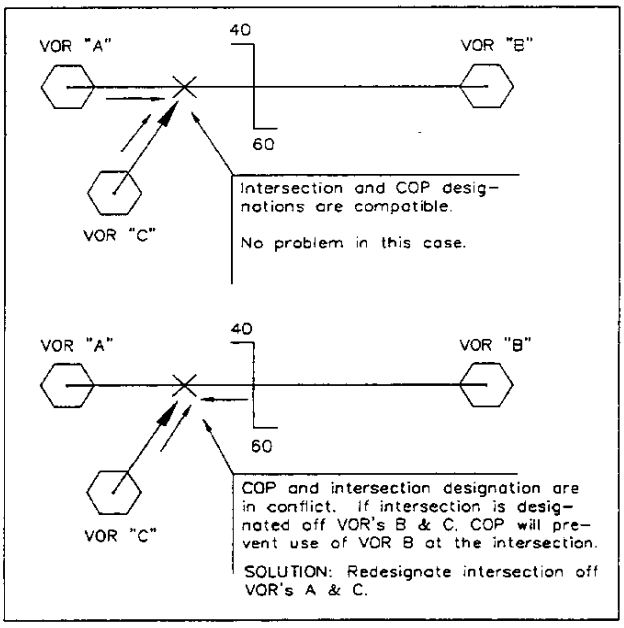


Figure 2-6. PROPER AND IMPROPER METHOD OF DESIGNATING A NAVIGATIONAL FIX

267. MINIMUM RECEPTION ALTITUDES (MRA).

At certain navigational fixes, VOR reception from an off-course facility may not be adequate at the lowest MEA associated with the route segment. In such cases when the MRA at the fix is higher than the MEA for instrument flight, the MRA shall be established for the fix and indicated on Forms 8260-2 and 8260-16. Once established, an MRA will not be revised unless the reception altitude is changed by 200 feet or more (see paragraph 905d(2)(e)).

268. FLIGHT INSPECTION.

After completion of required coordination, flight inspection personnel shall confirm facility performance at the proposed operational altitudes. Where possible, determinations shall be predicated on current facility performance records; otherwise, a flight check shall be accomplished.

269. MAXIMUM AUTHORIZED ALTITUDES (MAA).

MAA's are procedural limits which might be determined by technical limitations or such other factors as limited airspace or compatibility with other procedures. Where MAA's are required in connection with the publication of flight procedures, they are included on Forms 8260-2 and 8260-16, or worksheets used to process the data. See also paragraph 905d(2)(e).

SECTION 11. OBSTACLE DATA ACCURACY

270. GENERAL.

The primary purpose of obstacle evaluation is to determine how an object will impact instrument flight procedures. The evaluations can provide accurate, consistent, and meaningful results and determinations only if AVN-100 procedures specialists apply the same rules, criteria, and processes during development, review, and revision phases. This section establishes the minimum accuracy standards for obstacle data and its application in the development, review or revision of instrument procedures, and provides information on the application of the minimum accuracy standards. The minimum standards are to be applied by AVN-100 specialists in all instrument procedures obstacle evaluations.

271. OBSTACLE DATA ACCURACY STANDARDS FOR INSTRUMENT PROCEDURES.

This paragraph identifies the MINIMUM requirement for accuracy of obstacle data used in the development of instrument procedures, and provides minimum accuracy standards for each instrument procedure segment.

a. Concept. Obstacle data accuracy is not absolute, and the accuracy depends on the data source. The magnitude of the error does not preclude the use of these data, provided it is identified and accounted for. In some cases, upgrading obstacle accuracy can provide relief from operational restrictions in an instrument procedure. This will allow expenditure of funds for obstacle surveys in areas where benefit to the aviation community would result. In no case, however, will the application of obstacle data accuracy preempt the requirement for the flight check of an instrument procedure for discrepancies. For sources of obstacle data accuracy, see appendix 2.

b. Standards. The minimum accuracy standards in this order are for use in the development, review, and revision of instrument procedures. They shall be applied to all new procedures and to existing procedures at the next revision or periodic review, whichever occurs first. The minimum accuracy standards are listed in paragraphs 271b(1) through (5). ADJUST the location/elevation data of the segment controlling obstacle by the amount indicated by the assigned accuracy code ONLY if that assigned code does not meet or exceed the following standards. For example, if the nonprecision final segment controlling obstacle has an assigned accuracy code 4D, adjust its location data by +250' laterally, and its elevation data by +50' vertically; this is because 4D does not meet or exceed the minimum accuracy requirement of +50' horizontal and +20' vertical (2C) applicable to the nonprecision final segment.

(1) +20' horizontal and +3' vertical accuracy. Precision final segment.

(2) +50' horizontal and +20' vertical accuracy. Nonprecision final segment; missed approach 40:1 surface evaluation; circling areas. For departures and SID's: Zone 1/Section 1 and first 2 NM of departure route.

(3) +250' horizontal and +50' vertical accuracy. Intermediate segment. For departures and SID's: Zones 2 and 3; Section 2; and beyond first 2 NM of departure route.

(4) +500' horizontal and +125' vertical accuracy; (1000' ROC and Special ROC); (non-mountainous). Initial segments; feeder segments; en route areas; missed approach holding/level surface evaluation; MSA; ESA; MVA; EOVM; MIA; DF Vector Areas. For SID's: level route portion.

(5) +1000' horizontal and +250' vertical accuracy; (2000' ROC) (mountainous). Feeder segments; en route areas; ESA's, DF Vector areas. For SID's: level route portion.

(6) In all cases, if it is determined that the horizontal and/or vertical uncertainty adjustment associated with the controlling obstacle must be applied, **application shall be in the most critical direction;** e.g., applied in the horizontal and/or vertical direction which most adversely affects the procedure.

(7) If the controlling obstacle elevation plus accuracy code adjustments **affects a minimum**

altitude or gradient, and a higher order of accuracy could reduce an adverse operational effect, then take action to have the accuracy improved; or adjust the procedure accordingly (see paragraph 272).

(8) Take no further action if the controlling obstacle elevation plus accuracy code adjustment does not affect a SIAP minimum altitude or gradient.

(9) AVN-100, in coordination with Air Traffic, shall determine the accuracy standard to apply in the evaluation of a proposed obstruction, and to apply in the development/revision of any affected procedures.

c. IAPA Data Base. The IAPA obstruction database file contains obstacle location and elevation data as provided to AVN by the NOS. The data contains both verified and unverified obstacles. Discrepancies in the IAPA obstacle database found in the development, review, and revision of instrument procedures shall be identified to AVN-22A.

272. APPLICATION.

Adjust the instrument procedure to meet the requirements of the minimum accuracy standards. When an altitude adjustment is required which would adversely affect the procedure minimums, evaluate the nature, magnitude, and rationale for the adjustment; then review records to identify an existing source validating a higher level of accuracy which could preclude the need for adjustment. Where the review fails to produce an improved accuracy source, notify the appropriate Airports Division for assistance relative to existing obstructions; or notify the appropriate Air Traffic Division when the review involves a proposed structure or modification to an existing structure being studied in the Obstruction valuation (OE) program. AVN-100 need not delay further processing of affected procedures pending receipt of higher level accuracy data ONLY where operationally prudent.

a. Manual. When manually developing the procedure, identify all controlling obstacles on FAA Form 8260-9 in coordinates to the second, and assign the highest order of accuracy known for the data source (see paragraph 909).

b. IAPA. When using IAPA to develop the procedure, apply the accuracy standards as follows:

(1) Obstacle accuracy standards shall be applied when determining the altitude(s) to be charted.

(2) If segment altitude adjustments are made to meet the requirements of the minimum accuracy standards, state the reason for the adjustment on the applicable menu.

c. Evaluation Sequence. In either paragraphs 272a or b, first determine the controlling obstacle using raw obstacle data. Then add horizontal/vertical accuracy code adjustments to the raw values to determine the obstacle's most adverse location and elevation. Accuracy code adjustment is not applied to obstacles evaluated relative to Order 8260.3, paragraphs 289 or 332.

d. "Controlling Obstacle" has the following definitions for the purpose of application and documentation:

(1) For precision SIAP final segments, that obstacle which, having penetrated the obstacle clearance or transitional surface, requires the highest glide slope above 3° and/or causes the most adverse decision altitude (DA) adjustment. Where there are multiple penetrations, first determine the required DA adjustment for each obstacle using raw obstacle data. Then, having determined the controlling obstacle, recalculate the required DA adjustment using accuracy code adjusted data.

(2) For nonprecision final segments, intermediate, initials, holding, feeders, etc., the obstacle in the primary area (or secondary area equivalent) which has the highest elevation.

(3) For barometric VNAV final segments, that obstacle which causes the most adverse DA or requires the highest vertical path angle (VPA) above 3°.

(4) For missed approach segments, that obstacle which, having penetrated a missed approach obstacle clearance surface, causes one of the following:

(a) Highest **DA/MDA**;

(b) Most adverse **MAP relocation**;

(c) Highest **climb gradient** for ILS Category II or III (or any other procedure with waiver).

(5) For missed approach level surface, that obstacle in the primary (or secondary equivalent) which has the highest elevation.

(6) For DP's, that obstacle which, having penetrated the 40:1 Obstacle Identification Surface (OIS), causes the most adverse climb gradient and/or ceiling and visibility to be published.

273-279. RESERVED.

SECTION 12. WAIVER OF STANDARDS

280. GENERAL.

Submit a request for a waiver of flight procedures standards on an approved computer generated FAA Form 8260-1, Flight Procedures Standards Waiver (see paragraph 903). Each waiver request will be considered ONLY when there is no other suitable way to resolve a procedural problem, or to provide a required service. The waiver is used to officially document the nonstandard application of criteria, and serves as a means to identify criteria that may require further refinement or to identify problem areas.

281. WAIVER PROCESSING.

Request waivers by completing the front of Form 8260-1. Detailed instructions for completing the form are contained in chapter 9, section 3. Figure 9-1 provides an easy reference for waiver form processing and routing requirements.

a. Forward the original FAA Form 8260-1 and supporting data for approval to AFS-400 through AFS-420. For U.S. Army procedures, forward waiver requests for approval to the U.S. Army Aeronautical Services Agency (USAASA) or U.S. Army Aeronautical Services Detachment, Europe. Use the specially adapted automated version of the Form 8260-1 for U.S. Army waiver processing.

b. Complete documentation and supporting data must accompany the waiver request so reviewing offices can conduct an evaluation without additional research. Submit appropriate 8260-series forms with each request. Include large scale charts depicting the procedure and/or obstacles which are the subject of the waiver.

c. Enter only one waiver request on the waiver form.

d. When a procedure is amended, reprocessing of an existing waiver is not necessary unless the reason for the amendment directly impacts the basis for the waiver.

e. When a waiver is proposed for obstacle penetration of ILS final or straight missed approach surfaces, request a Collision Risk Model (CRM) study through AFS-420. Refer to Order VN 8260.4, ILS Obstacle Risk Analysis. At the time of the request, provide all data required for conducting the study. AFS-420 then analyzes and interprets the result of the CRM and provides the results to AVN-100.

f. The Flight Procedure Standards Branch, AFS-420, reviews all waiver requests, and develops and forwards the proposed Flight Standards endorsement to AFS-400 for final action. When necessary, Flight Standards will annotate the Form 8260-1 that approval is contingent upon a successful flight inspection report.

g. AVN is responsible for ensuring that an approved waiver of standards is on file for each instrument procedure requiring waiver action. AFS waiver approval shall be obtained before submitting the procedure to NFDC for publication.

282. WAIVERS FOR SPECIAL INSTRUMENT APPROACH PROCEDURES.

Except for proponent developed procedures, when a waiver is approved for a special instrument approach procedure, AVN shall coordinate with the appropriate FSDO concerning any special conditions that may be imposed on the use of a special authorization. This action is necessary to establish required supervision to ensure user compliance with equivalent level of safety provisions. For example, special aircrew training may be required as an equivalent level of safety.

283. PERIODIC REVIEW OF WAIVERS.

AVN shall review approved waivers biennially to determine whether the waivers are still required. Cancel unnecessary waivers.

284. CANCELLATION OF WAIVERS.

a. Cancellation of waivers shall include a reason in the comments block. Such termination may be directed by AFS-400. AVN is responsible

for planning ways to eliminate waivers through the modification, addition, or relocation of navigation facilities.

b. Distribution of a canceled waiver shall be made to the same organizations that received the approved waiver (see paragraph 903).

285-289. RESERVED.

SECTION 13. IAPA PROCEDURES DEVELOPMENT AND PROCESSING

290. GENERAL.

The FAA Instrument Approach Procedure Automation (IAPA) system has been developed and is being incrementally implemented. In addition to automated procedure development, the system provides for automated storage and transmittal of instrument flight procedures. AVN-100 should use the IAPA system to develop fixed-wing, original or amended, nondirectional beacon (NDB) and Very High Frequency Omni-directional Range (VOR) SIAP's; and Global Positioning System (GPS) instrument procedures to the extent permitted by approved IAPA programming. Use of IAPA is not mandatory; however, because IAPA ensures accurate computations and approved interpretation of criteria, it shall be used to the maximum extent permitted by certified software programming.

a. Waivers. The standardized, programmed criteria shall be applied to develop and store SIAP's using the design sequences of IAPA software. For nonstandard application of criteria, a waiver must be on file or initiated. SIAP's having design requirements or waivered construction that cannot be processed on IAPA must be completed manually.

b. Other SIAP types or additional instrument procedures should be developed on IAPA as software programming permits. Additional software programs to support these SIAP's and other instrument procedures will be implemented at a later date as time and resources permit.

291. IAPA RECORDS DISPOSITION. Use guidelines and procedures identified in Order 1350.15, Records Organization, Transfer, and Destruction Standards, to determine the correct disposition standards for all records created utilizing the IAPA system.

292-299. RESERVED.

CHAPTER 3. EN ROUTE PROCEDURES

SECTION 1. GENERAL

300. GENERAL.

a. *The en route airspace structure of the National Airspace System* consists of three strata. The first, or lower stratum, is an "airway" structure which extends from the base of controlled airspace up to but not including 18,000 feet MSL. The second stratum contains identifiable jet routes as opposed to designated airways, and extends from 18,000 feet MSL to Flight Level (FL) 450. The third stratum, FL 450 and above, allows random operation.

b. *The standards in chapter 17 of TERPS* are concerned with the first two strata and apply to the establishment of flight procedures for airway and off-airway routes in the lower stratum, and for designated and non-designated jet routes in the second stratum. The criteria establish obstacle clearance limit standards applicable to the segments of each airway or route, and to the turning areas required to transition from one airway or route to another. Consideration is also given to communications requirements and to the use of radar to fill navigation "gaps." In areas outside the continental United States which do not have the airway structure divided as above, the criteria apply to the corresponding altitude levels in the development of en route procedures.

301. PUBLICATION.

a. *En route minimum altitudes.* MEA (Minimum Enroute Altitude), MRA (Minimum Reception Altitude), MAA (Maximum Authorized Altitude), MOCA (Minimum Obstruction Clearance Altitudes), MCA (Minimum Crossing Altitudes), and COP (Changeover Point) are established by the Federal Aviation Administration for instrument flight along Federal Airways in FAR Part 95. They may be established for off-airway routes within the United States and its territories. The altitudes are established after it has been determined that the navigation aides to be used are adequate and so oriented on the airways or routes that signal coverage is acceptable, and that flight can be maintained within prescribed route widths.

b. *Altitudes and changeover points* are published regularly in the Federal Register as Part 95 of the Federal Aviation Regulations (FAR). The master lists of Part 95, COPs, direct routes, intersections, holding patterns, and off-airway routes (non-Part 95) are maintained by NFDC.

302-309. RESERVED.

SECTION 2. CRITERIA APPLICATION AND DEVELOPMENT

310. CRITERIA APPLICATION.

The criteria contained in chapter 17 of TERPS have been developed primarily for application to the VHF navigation system. When en route flight procedures using the LF or integrated (VHF-LF) navigation are required, standards have been included in the appropriate sections for application to the use of these systems during the remaining life of the LF system. However, since the navigation system is based upon the VORTAC, the use of LF navigation facilities will be considered a system deficiency and shall be limited to those cases where no other course of action is possible and where a definite operational requirement can be justified.

311. DEVELOPMENT OF CRITERIA.

To assist in understanding the criteria, the methods used in its development are being included. An en route segment involving flight between two points is a flight procedure. As such, it must be provided with characteristics which result in safety and practicality in all aspects. Safety and practicality in a flight procedure are dependent upon the pilot, the aircraft, and the navigation system being used. The operational characteristics of all three were evaluated collectively, and the results of the evaluation applied to the operating environment. In the development of en route criteria, the total problem was broken into two parts: First, the pilot/aircraft combination; and second, the navigation system. Data considered essential in these areas were assembled and combined to find a total system accuracy factor.

a. *Pilot/Aircraft.* Most of the work in this area was done in the Aeronautical Center flight simulator, but some tracking data were obtained from actual flight. Two types of information were required: pilot habits in tracking the radial and the flight track resulting from turns at various speeds and altitudes under various wind conditions. The more critical turn tracks were lifted from simulator tracings and incorporated in the criteria for direct application through the use of turning area templates.

b. *Navigation System.* Quantitative values were developed to determine the probable aircraft displacement resulting from the combination of navigation facility radial alignment displacement, transmitter monitor tolerance, receiver accuracy, and finally, the previously determined pilot/aircraft tracking accuracy. These factors were processed using the Gaussian (normal) curve, and probability factors determined.

c. *Probability.* System accuracy resulting from these computations is: at 95% probability, a system accuracy of plus-or-minus 4.5 degrees, and a 99% probability a system accuracy of plus-or-minus 6.7 degrees (for VOR/VORTAC facility signals). The 4.5 degree figure became the basis for primary area obstacle clearance criteria, airway and route widths, and the ATC separation procedures. The 6.7 degree value provides secondary obstacle clearance area dimensions.

312-319. RESERVED.

SECTION 3. ESTABLISHMENT OF EN ROUTE AIRSPACE

320. RELATIONSHIP OF COP's TO AIRSPACE DIMENSIONS.

Application of these criteria considers the location of the COP for determining the dimensions of the required associated airspace. When it is anticipated that the COP will be established beyond 51 nautical miles from the facility, the location of the COP should be determined by AVN-100 during the development of airspace proposals within the region. On new facilities, a reasonably accurate estimate of the COP should be obtained during the site survey. Other data, such as MEA, MOCA, MRA, etc., should also be obtained at this time. This information will assure the completion of necessary airspace planning in the region, and will permit the description of all required airspace in the Notice of Proposed Rule Making (NPRM).

321. RELATIONSHIP OF MEA'S TO CONTROLLED AIRSPACE FLOORS.

a. Buffers. MEA's for routes wholly within controlled airspace will normally provide for a buffer above the floor of controlled airspace. This buffer will be at least 300 feet within Class E airspace containing terminal instrument procedure segments (feeder, initial, intermediate, final, missed approach), and 500 feet within the low altitude airway structure. However, exceptions may be made which provide only 300 feet buffer below these airways where the lesser buffer area will permit retaining a cardinal altitude or otherwise result in a definite operational advantage. Establish these buffers to the nearest 100-foot increments: e.g., 1049.99 feet becomes 1000 and 1050.00 feet becomes 1100 feet. Refer to FAA Order 7400.2, Procedures for Handling Airspace Matters.

b. Rounding. Where rounding off MEA's to the nearest 100 feet results in a vertical separation between the floor of controlled airspace and the MEA of not less than 451/251 feet, consider such separation as being in practical compliance with that of 500/300 feet specified in applicable criteria.

322-329. RESERVED.

SECTION 4. SUBSTITUTE EN ROUTE FLIGHT PROCEDURES

330. GENERAL.

a. Air Route Traffic Control Centers (ARTCC's) are responsible for specifying essential substitute airway or route segments (sub-routes) and fixes for use during scheduled or unscheduled VOR/VORTAC shutdowns.

b. AVN-100, in coordination with ARTCC's, determines when the length of outages or other factors require publication of sub-routes.

c. AVN provides flight inspection services, obstacle clearance verification, certification, and final approval of substitute routes.

331. FORMAT.

ARTCC's can use a format similar to that shown in figure 3-4 in preparing substitute routes for scheduled or unscheduled facility shutdowns, and for submission of the sub-route to AVN-100 for approval. Substitute routes shall be described from navigational fix to navigational fix, to accurately define the route to be used. An MEA and an MAA shall be provided for each route segment. Temporary reporting points should be substituted for the out-of-service facility and only those other reporting points which are designated as essential by Air Traffic. Normally, temporary reporting points over intersections will not be necessary where center radar coverage exists. An MRA shall be established for each temporary reporting point. Where a substitute route cannot be developed for an existing route or reporting point, indicate none under the substitute column.

332. FACILITIES USED.

Substitute routes should normally be based on VOR/VORTAC aids established and published for use in the altitude strata concerned. However, in the case of substitute routes in the upper airspace stratum, it may be necessary to establish routes by reference to VOR/VORTAC facilities utilized in the low altitude system. NDB facilities may only be utilized where VOR/VORTAC coverage is inadequate and ATC requirements necessitate use of such aids. Where operational necessity dictates, process an ESV request (see paragraph 210). Temporary reporting points may be established in connection with the substitute routes and, where possible, a temporary reporting point will be established over the facility being shutdown.

333. CONTROLLED AIRSPACE.

Substitute routes may be approved as long as the centerline of the route is contained within controlled airspace. Designation of additional controlled airspace to contain substitute routes need not be accomplished because of the temporary nature of the routes. Substitute routes for off-airway (non-Part 95) routes need not be in controlled airspace (see figures 3-1 and 3-2).

334. FLIGHT INSPECTION.

Substitute routes are flight inspected in accordance with FAA Order 8200.1. If substitute routes do not overlie existing routes, or are wider than existing routes (see figure 3-3), map studies are required to identify controlling obstacles. AVN-100 shall document controlling obstacles on FAA Form 8260-16, Transmittal of Airways/ Route Data. Retain these forms locally for future review. Flight inspection verifies controlling obstacles.

335. PLANNING AND COORDINATION.

The regional Airway Facilities Division will provide the dates of proposed scheduled shutdowns to AVN-100, who shall maintain a schedule of shutdowns and the estimated duration of the outages. AVN-100 shall act on this information as far in advance as possible to enable timely submission of the sub-routes to NFDC for publication. AVN-100 should be prepared for the eventuality when publication of sub-routes is not related to scheduled outages.

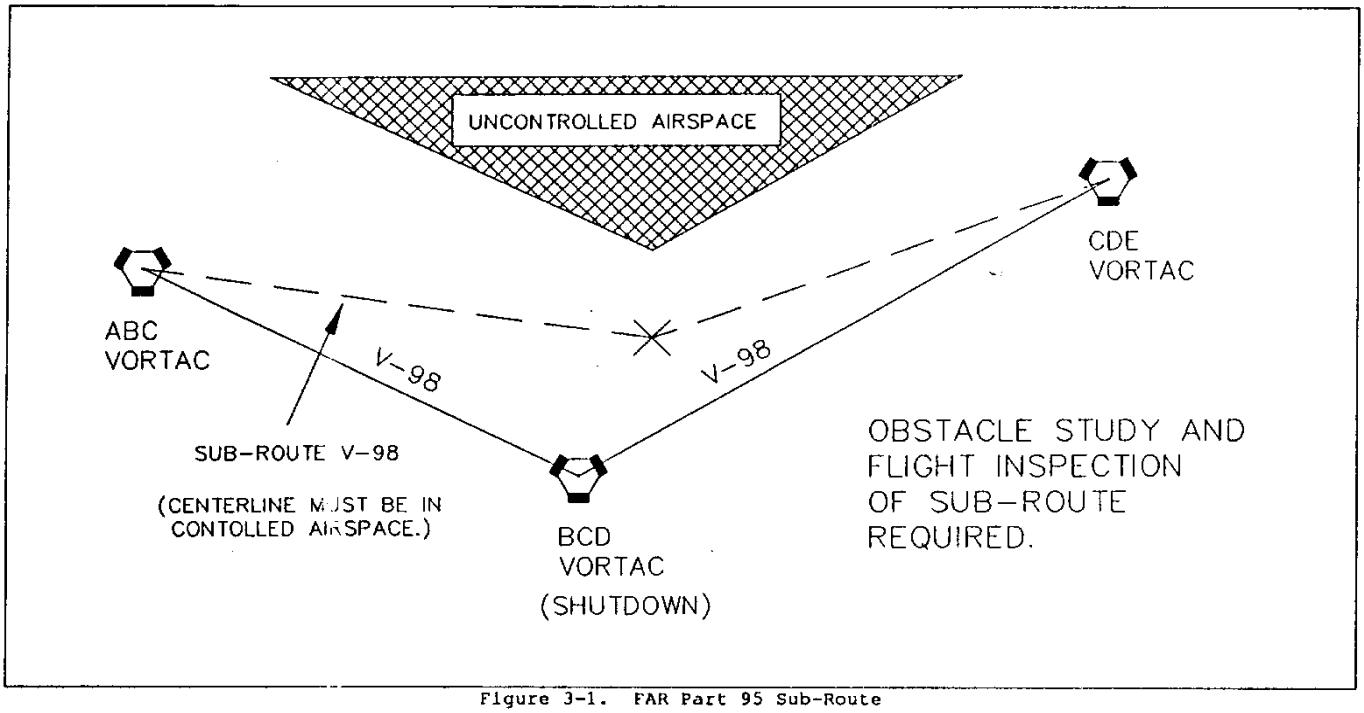


Figure 3-1. FAR Part 95 Sub-Route

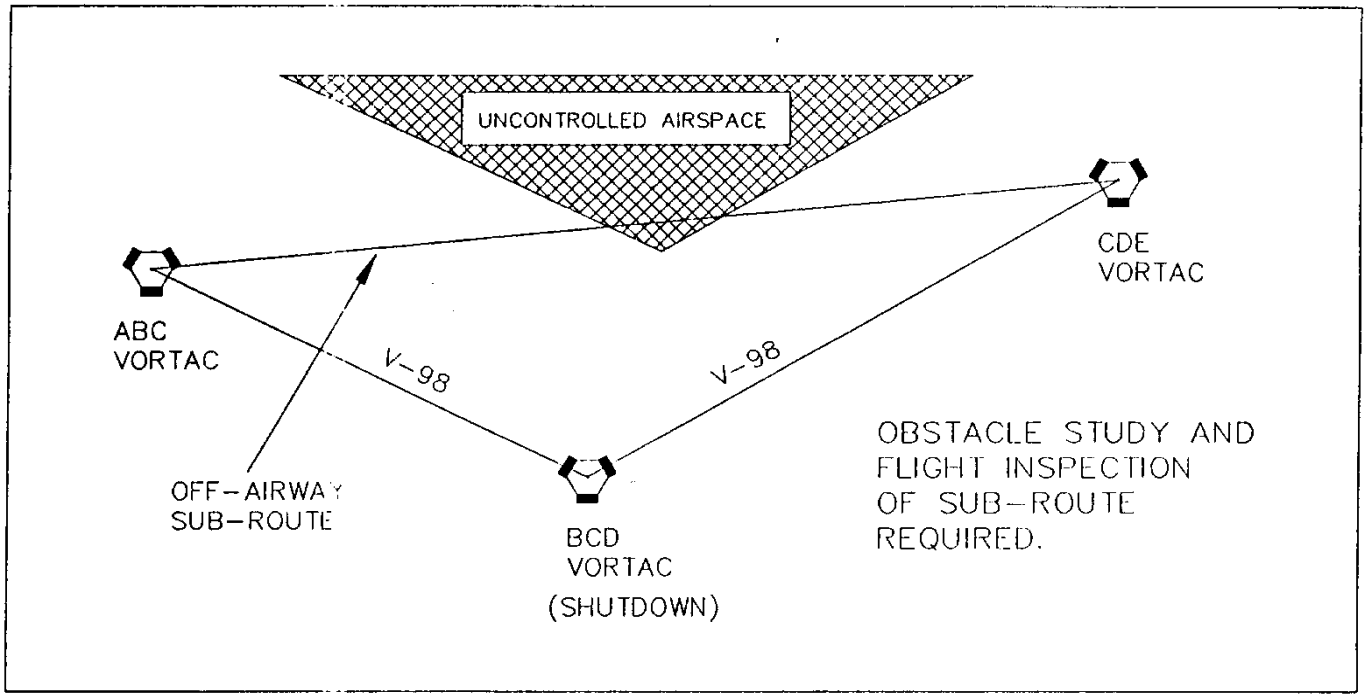
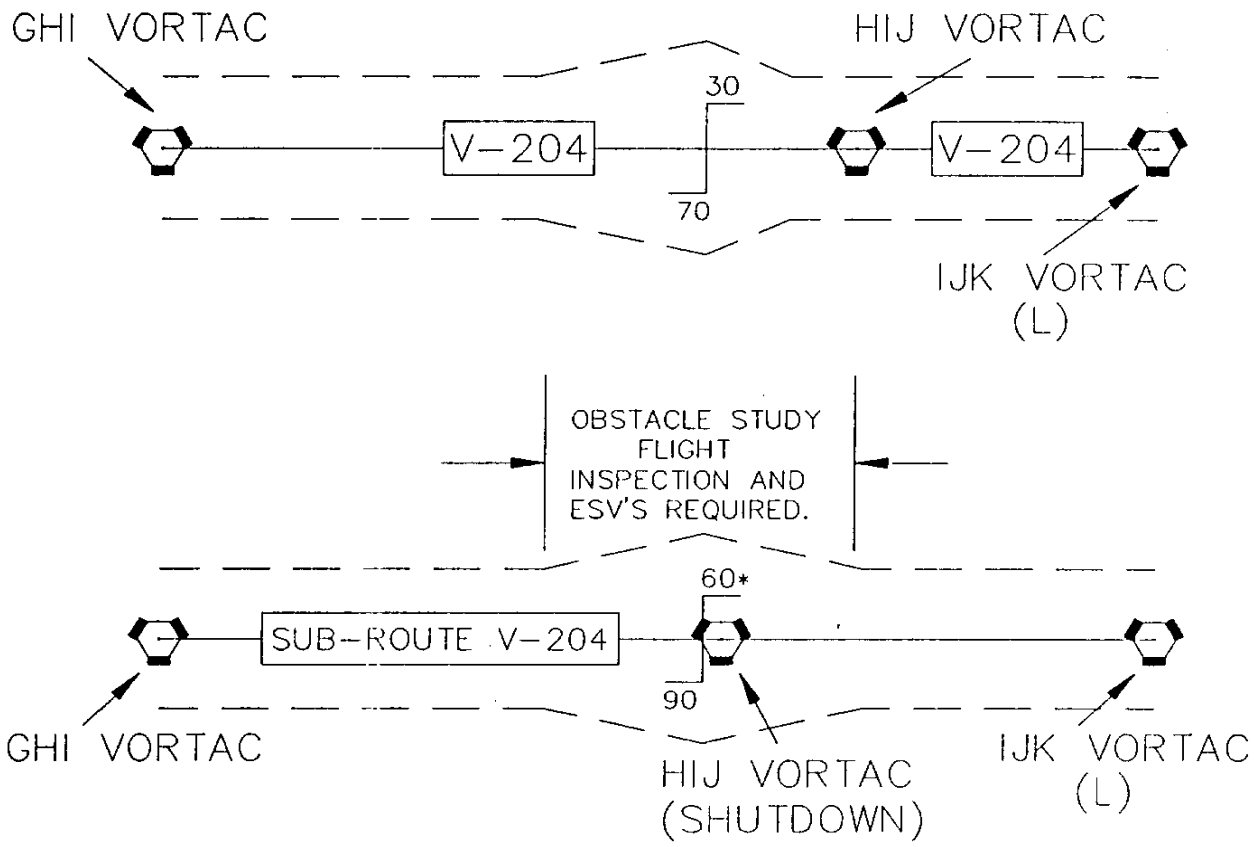


Figure 3-2. Non-Part 95 Sub-Route



* COP's are normally established over the shutdown facility; however, they may be established at any point for operational reasons: terrain, facility restriction, MRA, airspace, etc., providing flight inspection requirements are met.

Figure 3-3. Sub-Route Wider than Existing Route

SUBSTITUTE ROUTE STRUCTURE

Snowflake, CO, VORTAC shutdown, scheduled or unscheduled. For substitute routes, MEA's, and Reporting Points, use the following:

LOW ALTITUDE

	Existing Airways	Substitute Routes	MEA/MAA
V220	SKI VORTAC to SNO VORTAC	SKI VORTAC to Temp SNO Int via SKI R-340	10000/17500
V220	SNO VORTAC to MTN VORTAC	Temp SNO Int to MTN VORTAC via MTN R-152	11000/17500
Direct	SNO VORTAC to ASPEN Int	None	
Off-Airway	SNO VORTAC to VAL VOR	Temp SNO Int to VAL VOR via SBT R-259 to SBT, SBT R-040 & VAL R-220	15000/37000
	Existing Reporting Point	**Temporary Reporting Point**	**MRA**
	SNO VORTAC	Temp SNO Int: SKI R-340/82 & SBT R-259/65	10000
	RUTHY	SKI R-340/43	8500
	SARDY	Temp SARDY Int: MTN R-152/60 & SBT R-270	11000
	SILVR	None	

HIGH ALTITUDE

	Existing Routes	Substitute Routes	MEA/MAA
J233	BRR VORTAC to SNO VORTAC	BRR VORTAC to Temp SNO DME via BRR R-314	20000/45000
J233	SNO VORTAC to FUN VORTAC	Temp SNO DME to FUN VORTAC via FUN R-148	20000/45000
	Existing Reporting Point	**Temporary Reporting Point**	**MRA**
	SNO VORTAC	Temp SNO DME: BRR R-314/159 & FUN R-148/133	20000
	HILAN	BRR R-314/82	18000

Approved: _____, **Date** _____

(Name), Manager
National Flight Procedures Office, AVN-100

Figure 3-4. SUBSTITUTE ROUTE STRUCTURE

336. PROCESSING.

a. Lead Time. Process data concerning substitute routes sufficiently in advance of the effective date of the facility shutdown to assure publication when charting is required. To provide necessary lead time, the substitute routes must be forwarded to NFDC nine weeks prior to the chart's effective date. If the lead time cannot be provided, delay the shutdown or consider printing a special graphic NOTAM. Normally, shut-down of facilities scheduled for 28 days (half the life of the en route chart) or less will not be charted; however, traffic considerations at major terminals may make charting necessary for the short term shut-downs.

b. Submissions.

(1) ARTCC submitted substitute routes (see figure 4) require the signature of the AVN-100 Manager, or a delegated representative. This signature thereby indicates operational approval of these sub-routes for unscheduled use. This approval shall be submitted directly to the ARTCC concerned (see paragraph 338)b.

(2) When AVN-100 determines that publication is required for a scheduled or extended unscheduled outage, AVN-100 forwards the ARTCC submitted substitute routes to NFDC for publication (see paragraph 338a).

337. PERIODIC REVIEW.

a. The ARTCC should review substitute en route flight procedures at least once every 4 years and at any time changes occur in the airway structure. The ARTCC shall submit any required modifications to AVN-100 for certification and approval.

b. AVN-100:

(1) Notify the responsible ARTCC and withdraw approval when:

(a) Frequency protection can no longer be provided to support the sub-route procedure.

(b) Flight inspection data is not avail-able to support continued certification and approval of the sub-route procedure.

(2) Review existing and proposed sub-routes for required obstacle clearance at least once every 4 years.

(3) Notify the ARTCC of any amendments necessary.

338. DISTRIBUTION.

a. For Publication. List the shutdown dates in the cover letter.

FSD	1 copy
ATA-110	2 copies
ARTCC	1 copy
AVN-100 Original	

b. Non-Publication.

FSD	1 copy
ARTCC	1 copy
AVN-100 Original	

339. RESERVED.

SECTION 5. OFF-AIRWAY ROUTES

340. ESTABLISHMENT.

Establish off-airway routes in the same manner, and in accordance with the same criteria, as airways and jet routes. Off-airway routes predicated on public navigation facilities and wholly contained within controlled airspace will be published as direct 14 CFR Part 95 routes. Routes predicated on privately owned navigation facilities or not contained wholly within controlled airspace will be published as off-airway routes.

a. Process. Normally, requests for the establishment of off-airway routes are **initiated** by a scheduled air carrier operator through its Principal Operations Inspector (POI). Upon receipt of a request for an off-airway route, AVN-100 shall coordinate with the Air Traffic Division. The Air Traffic Division will process the route in accordance with Handbook 7400.2 to ascertain that there is no conflict in use of the airspace. Following AT coordination, AVN-100 shall evaluate the adequacy of off-airway routes. Consider the following:

(1) Type of aircraft and the navigation systems used.

(2) Proximity to military bases, training areas, and low level military routes.

(3) Adequacy of communications along the route.

b. AVN-100 Documentation. Document MEA's and related procedural data on FAA Form 8260-16. Return a copy of the form to the FSDO, indicating approval or disapproval of its request.

341. LISTING.

Pursuant to the responsibility of the Air Transportation Division (AFS-200) for surveillance of all authorized navigation facilities and routes, a requirement exists for maintaining a current listing of off-airway routes which have been assigned to air carriers by AFS operations personnel. These routes are documented in the National Flight Data Digest (NFDD) which is published by NFDC when changes occur.

342. OFF-AIRWAY DATA.

AVN-100 should establish arrangements for obtaining and maintaining complete off-airway route information. The following is suggested:

a. FSDO's provide AVN-100 with copies of all changes or cancellations to IFR off-airway route authorizations.

b. AVN-100 uses this information for development of flight inspection requirements and for maintaining current records.

343. PROCESSING DATA TO NFDC.

Use FAA Form 8260-16 to forward IFR off-airway data to NFDC. Do not designate off-airway non-14 CFR Part 95 routes as special routes even though associated with special instrument approach procedures.

344-349. RESERVED.

SECTION 6. NEW OR REVISED JET ROUTES

350. COORDINATION PROCEDURES

a. The regional Air Traffic Division provides AVN-100 with the Notice of Proposed Rule Making (NPRM) for new or revised routes.

b. AVN-100 Action: AVN-100 requests flight inspection to furnish a copy of the NPRM and forwards preliminary evaluation results to the AT division. If the proposal is satisfactory, include changeover point information. If the route is not satisfactory, provide alternate recommendations.

351. PUBLICATION OF PROCEDURAL DATA.

a. AVN-100 shall forward final route data, with the NPRM docket number, to NFDC on FAA Form 8260-16. This form must be submitted within the comment period specified in the NPRM. Conditions found during surveillance inspections of established routes, which would require a change of MEA, MOCA, MAA, or COP from the previously published data, shall be brought to the attention of the procedures specialist for corrective action.

b. The ARTCC, in conjunction with the regional System Management Branch (Axx-530), is responsible for developing airspace requirements for the routes published in 14 CFR Parts 71 and 75; and AVN-100 is responsible for developing the related procedural data published in 14 CFR Part 95.

352-359. RESERVED.

SECTION 7. RADAR VECTORING ALTITUDE CHARTS

360. CHART PREPARATION.

Radar vectoring charts are developed for areas where there are numerous minimum vectoring altitudes (MVA's) due to variable terrain features or manmade obstacles. The responsible ATC facility determines whether its radar systems require vectoring charts. Where vectoring charts are required, the ATC facility develops the basic chart in accordance with instructions contained in Order 7210.3, Facility Operations and Administration, or Order 7210.37, En Route Minimum IFR Altitude (MIA) Sector charts. AVN-100 personnel may be requested to participate in original chart development at the option of the ATC facility.

361. AREAS OF CONSIDERATION.

The area considered for obstacle clearance shall be the maximum range of the radar. This area may be subdivided into sectors to gain relief from obstacles which are clear of the area in which flight is to be conducted. There is no prescribed limit on the size, shape, or orientation of the sectors; however, they must be designed with consideration to aircraft maneuvering ability, obstacle clearance requirements, and air traffic flow requirements. To avoid excessively high minimum altitudes within a sector, prominent high obstacles may be isolated by enclosing the obstacle with a buffer area whose boundaries are at least three miles from the obstacle (five miles if 40 miles or more from the radar antenna). Vectoring charts should be designed to emphasize simplicity and safety in radar traffic control applications. Terminal MVA charts are oriented to magnetic north. An example of a Terminal MVA chart can be seen in Order 7210.3, chapter 3, section 9.

362. OBSTACLE CLEARANCE.

Obstacle clearance shall be provided over all obstacles within the vectoring areas or sectors established by ATC on the Terminal MVA chart or the En Route MIA chart, irrespective of the coverage determined by flight inspection. Selected altitudes shall provide clearance over all obstacles outside of the sector within 3 miles of the sector boundaries (5 miles if 40 miles or more from the radar antenna). In areas of overlapping radar coverage, where data from an antenna more than 40 miles away may be used, only 5 miles clearance shall be applied. ATC facilities will apply 1000 feet of obstacle clearance in non-mountainous areas and 2000 feet in areas designated as mountainous in 14 CFR Part 95. MVA's and MIA's should provide at least 300 feet above the floor of controlled airspace. Round off resultant altitudes to the nearest 100 feet. For example, 1149.99 feet becomes 1100 feet, and 1150.00 feet becomes 1200 feet.

NOTE: Controlled airspace considerations are the responsibility of ATC facilities. AVN-100 review shall assure the obstacle clearance requirements are met. It is the responsibility of the controller to determine that a target return is adequate for radar control purposes.

363. OBSTACLE CLEARANCE REDUCTION.

Where lower altitudes are required in designated mountainous areas to achieve compatibility with terminal routes or to permit vectoring to an instrument approach procedure, AVN-100 may approve reductions to the minimum altitude in accordance with the following:

a. ASR - 1000 feet of obstacle clearance may be authorized in accordance with Order 8260.3, paragraph 1041b(3).

b. ARSR - Reductions to not less than 1700 or 1500 feet of terrain clearance may be authorized with appropriate obstacle clearance in accordance with en route criteria contained in Order 8260.3, paragraphs 1720b(1) and (2).

c. When approving altitudes with less than 2000 feet of obstacle clearance, a record of such approval shall be maintained by AVN-100.

364. RADAR DATA PROCESSING (RDP).

ATC Centers are equipped with RDP that receives radar return from multiple antennas. MIA charts for these facilities shall provide obstacle clearance in accordance with paragraph 362 above or Order 8260.3, chapter 17.

365. CHART REVIEW AND APPROVAL.

a. Civil Vectoring Charts.

(1) ATC Action. The ATC facility prepares MVA/MIA charts, drawn directly on current sectional charts. It forwards a radar vectoring altitude chart package, consisting of two sectional chart MVA or MIA depictions and two FAA Forms 7210-9, Minimum IFR Altitude/ Minimum Vectoring Altitude Obstruction Documentation, to AVN-100 for review. The ATC facility updates, as required, and/or reviews the MVA/MIA chart annually to ensure accuracy, and jointly approves any amendment or review with AVN-100.

(2) AVN-100 Action. Review radar vectoring altitude chart packages only to ensure that obstacle clearance requirements are met. Coordinate any recommended adjustments in chart design, or necessary changes in vectoring altitudes or controlling obstructions, with the originating ATC facility. Upon completion of a satisfactory review, approve the chart over the signature of the AVN-100 Manager, or his/her designated representative, on the Form 7210-9, and return it to the ATC facility. Retain one copy of the MVA chart or the MIA chart, and FAA Form 7210-9.

b. Military MVA Charts. The FAA has no responsibility for the technical review of military MVA charts, with the exception of U.S. Army charts, which are reviewed in accordance with the NAT 127 Agreement and Order 8260.15. Honor other military requests on a time-available basis in accordance with guidelines contained in chapter 6.

366. EMERGENCY OBSTRUCTION VIDEO MAP (EOVM).

a. Establishment. An EOVM is established by ATC at terminal radar facilities that have radar coverage in designated mountainous areas, and is intended to facilitate advisory service to aircraft in an emergency situation wherein appropriate terrain/obstacle clearance minimum altitude cannot be maintained. Order 7210.3 states EOVM design, preparation, and production requirements.

b. EOVM Verification. The AT facility checks the original EOVM package and any subsequent changes for adequacy, and then provides a copy to AVN-100 to verify the accuracy of its information. Annually, the AT facility reviews the EOVM for adequacy, and forwards the results of its review, along with any changes, to AVN-100 for review and verification.

c. AVN-100 Review. Limit review of EOVM's provided by the AT facility to verification of contour elevations, mountain peaks, and other obstructions that are selected and depicted on a sectional chart.

367-399. RESERVED.

CHAPTER 4. TERMINAL PROCEDURES

SECTION 1. GENERAL

400. GENERAL.

The FAA has the responsibility to establish instrument procedures used for terminal operations at civil airports within the United States and its possessions. The FAA also provides or approves instrument procedures used by U. S. flag carriers at foreign airports.

401. CATEGORIES OF INSTRUMENT APPROACH PROCEDURES.

Procedures published in the Federal Register under 14 CFR Part 97 are identified as "Standard Instrument Approach Procedures" (SIAP's). These procedures are available to all users. Instrument flight procedures authorized for use only by air carriers or some other segment of the aviation industry are not published in the Federal Register and are identified as "Special Procedures." Special Procedures may be developed for public and private use based on aircraft performance, aircraft equipment, or crew training, and may also require the use of landing aids, communications, or weather services not available for public use (see paragraph 833).

402. AIRSPACE REQUIREMENTS.

a. Public use procedures and Special procedures at Part 139 airports shall be contained within controlled airspace in accordance with Order 7400.2, Procedures for Handling Airspace Matters.

b. Where an airport does not qualify for a Class B/C/D/E surface area, designate Class E 700′ airspace. In the latter case, landing minimums may be established below the floor of controlled airspace. A requirement for minor adjustment to existing controlled airspace, to fully encompass an instrument procedure, will not form the basis for withholding procedure publication. An approach procedure may be published prior to obtaining the optimum configuration of controlled airspace when the following conditions exist (see Order 8260.26, Establishing and Scheduling Standard Instrument Procedure Effective Dates, paragraph 6d(1)):

(1) **The centerline of all terminal routes** is located inside of existing controlled airspace.

(2) **The procedure turn area** out to the appropriate distance specified in chapter 5 is contained within existing controlled airspace.

(3) **The final approach fix** is contained within existing controlled airspace.

c. Special procedures other than those noted in paragraph 402a, should, where possible, be contained within controlled airspace in accordance with Order 7400.2. Special procedures may be established and approved outside of controlled airspace where it is not possible to designate controlled airspace. In such cases, annotate the procedure: "Procedure not contained within controlled airspace," and advise the appropriate FSDO that controlled airspace will not be provided. Do NOT use special procedures as a temporary measure pending designation of controlled airspace for public use procedures.

403. CONTRACTUAL USE OF PRIVATE FACILITIES.

An air operator may arrange for the use of a privately owned navigational aid (NAVAID). Such an arrangement requires a contractual agreement between the sponsor and the user regarding facility use. AFS shall coordinate all requests for contractual use of private navigation aids with the sponsor. Approval of the special instrument procedure for an operator is contingent upon the RFSD receiving a copy of an acceptable contractual agreement. Refer to paragraph 703 for procedures for the first time approval of a non-Federal NAVAID.

404. TERPS APPLICATION.

Develop all instrument approach procedures, except foreign procedures developed in accordance with Order 8260.31, Foreign Terminal Instrument Procedures, under the provisions of TERPS, and the guidelines in this document. The following special provisions and guidelines apply to selected paragraphs of TERPS criteria. The paragraph numbers refer to identically numbered paragraphs in TERPS.

a. Paragraph 5a(2), Simultaneous Procedures. Where simultaneous operations are authorized to parallel runways, or conflicting runways

having similar operational problems as parallel runways, note the authorization on each individual ILS procedure. Identify the procedure in accordance with TERPS paragraph 161.

b. Paragraph 122a, Airport. The runway lighting requirement does not apply to night instrument takeoff procedures.

c. Paragraph 122c, Obstacle Marking and Lighting. Do NOT deny instrument approach procedures due to inability to mark and light or remove obstacles which violate 14 CFR Part 77 surfaces. Exception: See TERPS paragraph 251b(2)(c). Objects which penetrate these surfaces are normally studied by AVN-100 prior to construction or alteration. AVN-100 recommendations for marking, lighting, or removal are made at that time.

d. Paragraph 151, Coordination Conflicts. AVN-100 shall make every effort to resolve coordination conflicts, and shall thoroughly evaluate objections received as a result of coordination or by direct inquiry. This evaluation should determine the validity of the comments and the course of action to be taken:

(1) **Acknowledge the comments** and amend or withdraw the procedure; or

(2) **Determine that the procedure** is correct as submitted. All adverse comments received, through formal coordination, shall be answered in writing. Conflicts which cannot be resolved by the region shall be forwarded to the Flight Procedure Standards Branch, AFS-420, with an information copy to the commenting agency.

e. Paragraph 160, Identification of Procedures. Military operators have stated a requirement for TACAN instrument approach capability to a limited number of airports. These airports have a prescribed VOR procedure, based on a VORTAC facility, where TACAN-equipped aircraft are expected to operate. VOR procedures at these locations may be executed by TACAN-equipped aircraft when the procedure is identified as **"VOR or TACAN."** This informs both the pilot and the controller that an approach may be executed with aircraft equipped with only VOR or with only TACAN. Approval of the use of individual VOR procedures by TACAN-equipped aircraft is subject to review for compliance with TERPS and flight check criteria. Take the following actions to implement this program:

(1) **Designate VOR/DME procedures**, predicated upon the use of VORTAC, as **"VOR/DME or TACAN"** provided flight inspection has determined that the TACAN and VOR components will support the procedure. These procedures require DME. Establish the missed approach clearance limit at a radial/DME fix in lieu of the VORTAC facility to accommodate aircraft equipped with only TACAN. FAF procedures identified ".../DME" are not authorized.

(2) **Establish a VOR type procedure** when a VOR procedure (no TACAN requirements) is required to accommodate non-DME equipped aircraft, and is predicated upon a VORTAC facility. However, establish combination VHF/DME fixes, where possible, for optional use by DME-equipped aircraft.

(3) **Make provision for TACAN-only** equipped aircraft to use VOR approach procedures when requested by the appropriate military authority, and procedure design and facility performance will permit. Where approval can be authorized, rename VOR procedures based on VORTAC facilities in accordance with the following examples: **"VOR or TACAN RWY 30, or VOR or TACAN-A."** Before this identification is used, flight inspection must determine that the TACAN azimuth alignment is satisfactory. Review and modify the procedure as necessary to fully support its use by TACAN-equipped aircraft:

(a) Establish the missed approach clearance limit at a combination VHF/DME fix for TACAN aircraft.

(b) Add DME fix capability to VHF intersections where required for TACAN use.

(c) Ensure that the procedure can be flown satisfactorily by reference to TACAN-only equipment.

(d) Ensure that the procedure can be flown satisfactorily by reference to VOR-only equipment.

(e) Ensure that holding is not authorized for TACAN-equipped aircraft at the VORTAC. This also applies to VOR/DME or TACAN procedures.

f. Paragraph 161, Straight-in Procedure Identification. When approaches meet straight-in

criteria for multiple runways, name the procedures accordingly.

Examples: **VOR RWY 14L/R**
NDB RWY 26L/C
VOR RWY 5/7

g. Paragraph 162, Circling Procedures.

(1) Do not duplicate the alphabetical suffix for circling procedures at an individual airport to identify more than one circling procedure. If more than one circling procedure exists, and regardless of the final approach alignment or type of facility, use successive suffixes.

Example: **NDB-A, VOR-B, LDA-C.**

(2) The alphabetical suffix for circling procedures shall not be duplicated at airports with identical city names within one state. Regardless of the airport name, successive suffixes shall be used for all airports which serve the same city.

Examples:

State	City	Airport	Procedure
Georgia	**Atlanta**	**Municipal**	**VOR-A**
Georgia	**Atlanta**	**DeKalb**	**NDB-B**
Georgia	**Atlanta**	**Fulton**	**VOR-C**

h. Paragraph 172, Effective Dates. See Order 8260.26. FAA policy does not permit the issuance of complete civil instrument approach procedures by NOTAM (see paragraphs 837 and 838).

i. Paragraph 221b, Emergency Safe Altitudes. This paragraph does not apply to civil procedures.

j. Paragraph 241, Altitude Selection. The FAF altitude shall not be less than the highest straight-in or circling MDA, including adjustments.

k. Paragraph 250, Final Approach Segment. For nonprecision approaches, the final approach segment area considered for obstacle clearance begins at the FAF and ends at the runway or missed approach point, whichever is encountered last. This concept applies to TERPS paragraphs 513, 523, 713, 953, and 1044. For precision approaches, the area considered for obstacle clearance begins at the precision final approach fix (PFAF) (i.e., glideslope intercept point) and ends at a point 200 feet outward from the threshold (see TERPS paragraph 930).

l. RESERVED.

m. Paragraph 261, Circling Approach Area Not Considered for Obstacle Clearance. Sectorize the circling area only to deny circling within a prescribed area.

n. Paragraph 270, Missed Approach Segment. The missed approach altitude shall not be less than the highest MDA, including adjustments.

o. Paragraph 283. Fixes formed by Radar. Coordinate with the appropriate air traffic facility before establishing a radar fix to assure the facility agrees to provide radar fix service when requested or required. When an air traffic facility advises that they can no longer provide radar fix service, revise procedures to remove the radar fix.

p. Paragraphs 275, 277b, 943, 945b, 1033, 1035b, Turning Missed Approach/Turning Area.

(1) The missed approach segment must be constructed with consideration given to all categories of aircraft. Plotting only the highest or heaviest authorized aircraft category area will not assure proper area evaluation for lower categories. Construct turning areas for the lowest and highest aircraft categories for turns at the MAP; or for turns at the end of the straight portion of the combination straight and turning missed approach. Where obstacle penetrations exist, evaluate the appropriate area for each category to determine specific aircraft category impact.

(2) Section 2 boundary terminates at Point B (or Point C for ILS or PAR) **only** if a fix exists at the end of section 1 **and** if course guidance is provided in section 2.

q. Paragraph 287c, Final Approach Fix (FAF). If the buffer or 40:1 surface evaluation identifies an obstacle penetration, you may clear the problem by increasing the minimum descent altitude (MDA) by the amount of obstacle penetration. When applying the buffer to a straight missed approach segment with positive course guidance, the area between the missed approach point (MAP) and the 40:1 rise starting point is considered missed approach primary area. The 12:1 surface begins where the 40:1 rise starts.

r. RESERVED.

s. Paragraph 311. When Category E mini-mums are required on civil procedures, use TERPS table 10 to establish visibility minimums. Category E minimums shall not be less than that required by table 9.

t. Paragraph 323b, Remote Altimeter Setting Source. Whether the use of a remote altimeter setting is primary or full-time, or secondary to a local source, establish the required visibility as stated in paragraph 404u.

u. Paragraph 330, Establishment of Visibility Minimums. For nonprecision approaches, use TERPS paragraphs 330c(1) and (2) and 251 to determine the minimum no-lights visibility. For precision approaches, TERPS paragraphs 251, 330c(1), and 350 apply.

(1) Circling minimums shall not be less than no-lights straight-in minimums.

(2) Visibility based on the distance direct from MAP to threshold shall be rounded to the next higher reportable value.

(a) When the visibility without light credit is less than 3 statute miles (sm), round the no-light visibility to the next higher quarter mile; e.g., 1.75 remains 1.75 sm, but 1.76 becomes 2 sm.

(b) When the visibility without light credit is greater than 3 statute miles, round the no-light visibility to the next higher whole mile increment; e.g., 4.00 remains 4 sm, but 4.01 becomes 5 sm.

v. Paragraph 333, Runway Visual Range (RVR). RVR shall be authorized on adjacent runways, when segments of those runways are located within a 2,000′ radius of the trans-missometer location and the requirements of TERPS paragraph 334 are met.

(1) RVR shall be authorized in accordance with the following. See Order 6560.10, Runway Visual Range (RVR):

(a) Category II/III Rollout RVR. Threshold plus 2,000′ of runway required within the 2,000′ circle.

(b) Category I ILS and nonprecision touchdown RVR. Threshold plus 1,200′ of runway required within the 2,000′ circle.

(c) Mid-field RVR. 2,000′ coverage of runway centerline including the runway midpoint required within the 2,000′ circle.

(2) When a transmissometer serves more than one runway and a Category II/III runway is involved, the touchdown RVR will be sited with respect to the Category II/III runway. RVR installations meeting requirements for use on adjacent runways may be utilized for reducing standard takeoff visibility.

(3) AVN-100 shall determine, in conjunction with Airway Facilities (AF), the following:

(a) Planned RVR installations, proposed commissioning dates, and runways to be served.

(b) Runways that meet the requirements for authorizing RVR.

(c) RVR installations that are to be used to report RVR for adjacent runways and the effective date of the procedures.

(4) AVN-100 shall revise affected procedures by the normal amendment process or P-NOTAM process.

w. Paragraph 334, Runway Requirement for Approval of RVR. If runway markings are removed or obliterated subsequent to the commissioning of the RVR, the RVR minimums may require adjustment. However, before an adjustment is made to the minimums, AVN-100 should advise the airport sponsor of the proposed course of action. Where corrective action cannot be accomplished within a reasonable length of time, AVN-100 shall submit a revised procedure reflecting the adjustment to landing minimums.

x. Paragraph 343, Visibility Reduction. The runway alignment indicator light (RAIL) portion of a MALSR or SSALR must be operating in order to retain visibility reductions authorized in TERPS table 9. Unattended approach light systems that have a radio control device for a pilot to exercise control over the system, qualify for the same minimums as light systems that are controlled from a ground position.

y. Paragraph 360, Standard Alternate Minimums. Do not authorize alternate minimums when the facility providing final approach guidance is a

Category III monitored facility (not monitored by ATC). If a procedure has a stepdown fix predicated on a Category III monitored facility, establish alternate minimums no lower than the minimum altitude without the fix. See TERPS paragraphs 213c(1) and (2). Standard alternate minimums provide a margin of safety over basic straight-in landing minimums. Where higher than basic landings minimums are required, consider an equivalent increase for the alternate minimums, particularly at remote airport locations. Similar consideration should be given when establishing alternate minimums at airports served by a single instrument approach which authorizes circling minimums only.

z. Paragraphs 413a(2), 513a(2)(b), 613a(2), and 713a(2)(b). Circling approach alignment criteria, using on-airport facilities, permits the use of all radials (360 degrees). It is not a requirement for the final approach course to pass through a portion of the landing surface.

aa. Paragraph 957, Missed Approach Segment. The missed approach area dimensions for the localizer differ from those of the full ILS, unless the MAP's are collocated. Evaluate both missed approach areas for obstacle clearance requirements. Provide a single missed approach procedure to serve both ILS and localizer approaches. An LDA, localizer-only, localizer back course, or SDF missed approach point shall be at least 3,000′ prior to the localizer facility. For precision approaches, or where a glide slope is used, the DH/MAP shall be no closer to the localizer antenna than a point where the localizer is 400′ wide. See Order 8200.1, paragraph 217.3206a.

bb. Paragraph 1201, Application.

(1) Apply diverse departure criteria to all runways at airports where public or special IAP's exist, and the FAA is the approving authority. If restrictions are not imposed, expect aircraft departures in all directions from all runways.

(2) If restrictions (40:1 surface penetrations) are identified for a specific runway in the diverse review, apply TERPS paragraph 1202 or 1203.

cc. Paragraph 1202. Defer that part of this paragraph pertaining to sectoring departures until further notice.

dd. Paragraphs 1202a(2), 1203a(2), 1203b(2)(a), and 1203c(2)(a). Originate the obstacle identification surface (OIS) at the elevation of the departure end of runway (DER). It may begin no higher than 35′ above the DER when required by existing obstacles. In the latter case, annotate the procedure with the minimum DER crossing height requirement; e.g., "CROSS DER AT OR ABOVE xx' AGL/xxx' MSL." Do not increase the origination height to accommodate new or proposed obstructions.

ee. Paragraphs 1202b(1) and 1202c(1). The "minimum altitude authorized for en route operations" is that altitude which allows en route obstacle clearance in conjunction with random (diverse) departures. Evaluate the 40:1 surface to an altitude equal to the highest obstacle elevation plus appropriate required obstacle clearance (ROC). Evaluate obstacles as follows:

(1) Construct Zones 2 and 3 OIS radial extensions from a point on the runway centerline 2,000′ from the start end of the runway out for a distance of 110 NM for CONUS and 140 NM for Alaska; construct the hemispherical boundaries accordingly. (The 110 NM approximates the distance for a 40:1 surface to reach 16,500′ - 14,500′ for the highest CONUS terrain plus 2,000′ ROC worst case. In Alaska, Mt. McKinley, 20,320′ plus ROC was used.)

(2) Determine the highest terrain/obstacle within this area; add appropriate ROC (Special ROC, etc.).

(3) Divide the results by 152′/NM. (This determines the actual radius for the obstacle search. Anything beyond this radius will be cleared by the 40:1 surface).

(4) Evaluate the area out to this radius for 40:1 penetrations. Measure the distance to the obstacles as in chapter 12. (Suggest searching the area out to a 10 NM radius first as most controlling obstacles are found in this area.)

(5) If there are no penetrations, diverse departures are authorized. Aircraft can be expected to safely depart in random directions from the airport to the altitude determined in paragraph 404ee(2).

(6) If there are penetrations, diverse departures are NOT allowed. Evaluate specific

departure routes to avoid obstacles. TERPS paragraph 1203 applies.

ff. Paragraph 1205a. Defer application of this paragraph until further notice.

gg. Paragraph 1205d. Since application of paragraph 1205e is deferred, a note shall be necessary (see paragraph 835d(2)(a)).

hh. Paragraph 1205e. Defer application of runway reduction until further study of practicality and method of implementation of this procedure has been completed.

ii. Paragraph 1205f. Delay expressing climb gradient in feet per minute pending an improved method of presentation, which is being developed.

jj. Paragraph 1207a. Defer application of this paragraph until further notice.

kk. Paragraph 1208. Defer application of this paragraph to obstacles greater than 3 SM from DER.

ll. Paragraph 1501r. Interpolate tables 15-1 and 15-2 or use the next higher values.

mm. Paragraph 1502g. Establish only one stepdown fix in a LORAN SIAP final segment.

nn. Paragraph 1512a. The 120° turn limitation does NOT apply for a feeder-to-initial segment connection where the initial segment is a course reversal.

405. SIDESTEP MANEUVERS. A sidestep maneuver is the visual alignment maneuver, required by a pilot executing an approach to one runway and cleared to land on a parallel runway. The following conditions shall exist:

a. Runway centerlines are separated by 1,200′ or less.

b. Only one final approach course is published.

c. Course guidance is provided on the runway centerline or within 3° of the runway centerline of the primary runway.

d. The procedure is identified in accordance with TERPS paragraph 161.

e. Final approach areas shall be established for both runways and shall be determined by the approach guidance provided. Both final approach areas shall be used to determine the MDA to the sidestep runway.

f. Use the same nonprecision obstacle clearance used for the primary runway to determine the published MDA for the sidestep maneuver.

g. Establish published visibility in accordance with table 6 or 11 of TERPS, whichever is higher.

(1) One-half mile visibility reduction is authorized if ALS, MALSR, or SSALR is installed to the sidestep runway. The minimum visibility after applying credit for lights must be no less than 1 mile.

(2) Visibility shall be increased 1/4 mile when the "sidestep" runway threshold is over 1,000′ closer to the FAF than the runway with course guidance.

NOTE: If descent gradient is exceeded, the sidestep maneuver shall NOT be authorized.

h. Sidestep minimums shall be published in accordance with the example below:

Minimums block:

S-ILS 27L
S-LOC 27L
SIDESTEP 27R
CIRCLING

406-419. RESERVED.

SECTION 2. STANDARD INSTRUMENT APPROACH PROCEDURES (SIAP)

420. GENERAL.

SIAP's shall be established in accordance with TERPS, other specific FAA 8260-series orders, and the policies set forth in this order. FAA policy and instructions for completing FAA 8260-series forms are contained in chapters 8 and 9.

421. COORDINATION OF TERMINAL INSTRUMENT PROCEDURES.

Coordination requirements for terminal instrument procedures are set forth in TERPS, chapter 1, section 5. See paragraph 908 for a sample formatted letter that can be used for coordination, and instructions for processing. AVN-100 shall initiate the letters. Evaluation and disposition of user comments are the responsibility of AVN-100. Valid user objections that cannot be accommodated by AVN-100 should be referred to AFS-420 for resolution prior to submission of the procedure for publication (see paragraph 837d).

422. RADAR INSTRUMENT APPROACH PROCEDURES.

ATC personnel determine which runways require radar instrument approach procedures and coordinate these requirements through AVN-100.

423-429. RESERVED.

SECTION 3. VISUAL DESCENT POINT (VDP)

430. ESTABLISHMENT. The VDP defines a point on a straight-in, nonprecision approach, including RNAV, where a normal descent from the MDA would commence if the required visual references were acquired.

a. Establish a VDP provided the SIAP meets the requirements of TERPS paragraphs 251, 252, and 253.

b. For chart clarity, a VDP should be no less than (1 mile OPTIMUM) (0.5 miles MINIMUM) from a final segment fix or MAP. If proximity closer than 0.5 miles is required, consider one of the following actions:

(1) Do NOT establish a VDP.

(2) Relocate the fix to the VDP location, and do NOT establish a VDP.

(3) Relocate the fix to accommodate the 0.5 mile (or greater) requirement.

NOTE: Option (2) above increases MDA and descent angle. Option (3) increases S/D altitude.

c. Do NOT adjust visibility minimums to accommodate a VDP.

d. Where used, the DME source shall be the same as the DME source for DME fixes in the final segment.

431. FAA FORM 8260-9 ENTRIES. To facilitate review, entries may be required in the REMARKS section. Where a VDP is not established, give the reason; e.g., obstacles penetrate VDP surface, descent gradient, proximity to final approach segment (FAS) fix, etc. (see paragraph 909c).

432-439. RESERVED.

SECTION 4. SPECIAL PROCEDURE PROCESSING INSTRUCTIONS

440-449. RESERVED

SECTION 5. DIRECTION FINDING (DF) PROCEDURES

450. GENERAL.

DF facilities have been established at air traffic facilities. Many of these have the capability to provide emergency approach procedure support where the DF antenna is suitably located with respect to an airport. This section describes a modified procedure to provide maximum stability in the approach by utilizing small degrees of turns and descents.

451. FORMAT.

The DF approach procedure shall be documented and approved on Form 8260-10, Standard Instrument Approach Procedure, and restrictively identified for emergency use only. Include a diagram showing the plan view of the procedure, including magnetic courses and minimum flight altitudes. Provide minimum safe altitudes to 100 miles from the DF antenna. Name the appropriate ATC facility on Form 8260-10 to identify the source of DF control.

452. APPLICATION OF CRITERIA.

Formulate the basic DF approach procedure in accordance with TERPS chapter 8 (see also paragraph 216c(4). Modify the approach pattern in accordance with the following guidelines:

a. Initial Approach Segment. The initial approach for on-airport facilities includes all portions of the approach between the station passage and the final approach course. Approach procedures for DF facilities located off the airport shall have an intermediate segment, in accordance with TERPS paragraphs 812 and 813. The following is a description of the modified low altitude triangular pattern:

(1) **A 30° angle of divergence** exists between the outbound course and the reciprocal of the inbound course.

(2) **The outbound leg** is established as a 3-minute leg.

(3) **The base leg** is formed by a 120° turn to position the aircraft 90° to the final approach course.

(4) **Two 45° turns** are provided to place the aircraft on final approach. These turns are depicted on the diagram and executed at the discretion of the DF operator.

b. Minimum Altitudes. Show minimum altitudes for each approach segment except for the portion between the 45° turns. Establish the minimum altitude for the final approach segment in accordance with TERPS paragraph 321. Since these are emergency procedures, do NOT establish ceiling and visibility minimums.

c. Identification of Procedures. Normally, develop only one approach procedure for each DF location. More than one procedure may be developed when procedures for low and high performance aircraft are not compatible. Identify procedures in accordance with TERPS paragraph 161.

453. DF VECTORING ALTITUDES.

Where a DF approach procedure is not authorized, DF vectoring altitudes may be developed for use by the controlling facility. Altitudes shall be entered on Form 8260-10 and shall be identified as DF vectoring altitudes. Required obstacle clearance is 1,000′. Round altitudes to the next higher 100′ increment. Minimum accuracy standards for controlling obstacles are stated in paragraph 271b.

454. DF VECTOR AREA.

a. Criteria. Construct the DF Vector area in accordance with paragraph 451, and TERPS chapter 8.

b. Sector Radii.

(1) **Outer sector radius** is 100 NM.

(2) **Middle sector radius** is 40 NM (Doppler) or 30 NM (VHF/DF).

(3) **Other distances** may be used to sectorize around obstructions and otherwise, if operationally justified.

(4) **Use a 20 NM sector radius** for a low altitude SIAP, and the 30/40 NM radius for high altitude penetrations.

(5) **Radii less than 10 NM** should be used with caution due to the requirement for adjacent sector obstacle coverage stated in TERPS paragraph 810.

c. Sector reduction. Use a minimum number of sectors by combining sectors where possible.

NOTE: Remember that DF is for emergency use; and ATC is attempting to get the aircraft into radar coverage or a clear area where the aircraft can let down VFR.

d. Minimum safe or sector altitudes may be increased and combined with adjacent higher sectors when a height difference does not exceed 500'- UNLESS an operational requirement exists for lower altitudes (e.g., initial approach altitude for DF SIAP).

455. DISTRIBUTION.

AVN-100 shall prepare and approve the Form 8260 10, assign the effective date, and distribute as follows:

FPO	1 copy
FSS/Tower providing DF Service	1 copy
ARTCC	1 copy
ATA-110	1 copy
AVN-100	Retain Original

456. CANCELLATION OF DF PROCEDURES.

When the DF procedure or DF Vectoring area is no longer required, AVN-100 shall take action to cancel the procedure. Continued need shall be determined during the biennial review.

457-459. RESERVED.

SECTION 6. CATEGORY II AND III ILS

460. GENERAL.

a. Guidance. The following directives contain criteria to be used in the development or amendment of ILS Category II and III procedures:

(1) Order 8260.3B, chapter 9; or **Order 8260.36A,** Civil Utilization of Microwave Landing System (MLS).

(2) AC 120-29, Criteria for Approving Category I and II Landing Minima for FAR 121 Operators, appendix 2.

(3) AC 120-28C, Criteria for Approval of Category III Landing Weather Minima, paragraph 8.

(4) Order 8200.1, United States Standard Flight Inspection Manual, section 217.

(5) Order 8240.45, Flight Inspection of Type II ILS Facilities Used for Category III Operations.

(6) Order 6750.24, Instrument Landing System (ILS) and Ancillary Electronic Component Configuration and Performance Requirements.

(7) Order 8400.8, Procedures for Approval of Facilities for FAR Part 121 and Part 135 CAT III Operations.

b. Advise the general public of airports authorized Category I, II, and III minimums by publishing the appropriate 14 CFR Part 97 SIAP. Category IIIc minimums shall be included in the minimums format of the IAP (see paragraph 813k).

c. The minimum class of performance (see Order 6750.24) required for an ILS to support a published ILS Category II or III SIAP is as follows:

(1) Class II/T/2 for Category II operations.

(2) Class III/D/3 for Category III operations not less than RVR 700.

(3) Class III/E/3 for Category III operations not less than RVR 600.

(4) Class III/E/4 for Category III operations less than RVR 600.

d. A detailed explanation of the characters used to identify a facility's class of performance is contained in Order 6750.24, appendix 2. The first character (I, II, or III), ILS International Civil Aviation Organization (ICAO) standards, is determined jointly by flight inspection and engineering personnel. The second character (A, B, T, D, or E), localizer course structure, is determined solely by flight inspection personnel. The third character (1, 2, 3, or 4), ILS integrity and continuity, is determined solely by engineering personnel.

461. ACTION.

a. Regions. Regional Airway Facilities Division and AVN-100 coordination is essential. AVN-100, having planned Category II and III ILS runways in its area of responsibility, shall issue checklists to assure the system meets the necessary ground system and obstacle clearance requirements. See Order 8400.8.

NOTE: The requirements for the marking of ILS glide slope (GS) and localizer (LOC) obstacle free zones, and procedures for ensuring obstacle clearance with respect to aircraft on the ground, are contained in AC 150/5300-13, Airport Design.

b. AVN-100.

(1) AVN-100 shall forward the completed checklists to the Flight Operations Branch, AFS-410. AVN-100 shall advise the regional Flight Standards Division (FSD) when a Category II or III system has passed flight inspection. Notification shall contain the following information:

(a) Airport.

(b) Runway.

(c) Flight inspection completion date.

(d) Facility classification.

(e) Minimums:

Category II DA and RA.
Category III a/b/c RVR (as appropriate).

(f) Date approach procedure will be available.

(g) **Status of SMGCS Plan** (from regional AWO).

(2) **Amend ILS SIAP's** when Categroy II, IIIa, IIIb, and IIIc minimums are authorized. Where only Category II and IIIa are authorized, indicate Category IIIb and IIIc as not authorized (NA) (see paragraph 813k).

(3) **Irregularities in pre-threshold terrain** or HUD/autoflight system/radar altimeter characteristics might adversely affect radar altimeter indications and thus affect autoland performance of some aircraft (see paragraph 462). Until or unless these aircraft demonstrate normal radar altimeter readings and acceptable HUD/autoland operations on that runway, and this fact is listed in their operations specifications, they cannot conduct Category III HUD/autoland operations. AFS-410 acts as the clearing house for listing which combinations of autoflight systems/ runways are or can be approved, and is positioned for receipt of information from Flight Inspection, AAF, Airports, and airport authorities regarding irregular underlying terrain situations at new runways or runways at which future Category II/III procedures are proposed.

c. The Flight Inspection Technical Support Branch, AVN-210, shall maintain the current ILS performance classifications in the Aviation Standards Information System (ASIS) database. The regional Airway Facilities Division shall notify the Flight Standards Division and AVN-210 of individual ILS facility performance classification determinations, and any change in the performance class of a facility, so that changes in Category III authorizations can be made.

d. The regional FSD will provide user notification to AFS-410 when Category II or III operations are authorized. Notification shall contain the information obtained from AVN-100 (see paragraph 461b(1).

e. AFS-410 will update the Flight Standards Bulletin Board (BBS). This notification will provide ATA and operators with the planned availability of the new minimums for preparation of operations specifications, and autoland "testing" prior to publication of the SIAP.

462. RADIO ALTIMETER HEIGHTS.

The methodology used in computing radio altimeter setting is contained in Order 8260.23, Calculation of Radio Altimeter Height. Establish radio altimeter heights by utilizing the as-built approach light system (ALS) vertical profile drawings or drawings of equal accuracy. Use terrain elevations on the runway centerline extended to compute radio altimeter heights (see paragraph 461b(2)).

463. NOTAM REQUIREMENTS.

When any component of the ILS system fails to meet the appropriate performance tolerances, Airways Facilities issues a NOTAM (D) for suspension of Category II/III minimums. If the suspension will exist longer than 224 days or will be permanent, AVN-100 shall issue an FDC P-NOTAM or amend the 8260-series form deleting Category II and/or III minimums from the procedure (see also paragraph 224f(4).

464. WAIVER REQUIREMENTS.

When required, AVN-100 shall prepare a waiver request on Form 8260-1, in accordance with chapter 2, section 12, of this order.

465-469. RESERVED.

SECTION 7. DEPARTURE PROCEDURES (DP)

470. GENERAL.

a. AVN-100 is responsible for the development of instrument departure procedures (DP's) under Order 8260.46, Instrument Departure Procedure (DP) Program, and for the issuance of NOTAM's relating thereto.

b. Establish takeoff minimums or develop departure procedures only for those airports with approved instrument approach procedures.

c. When the AVN-100 study reveals obstacles requiring climb gradients greater than 200 feet per mile, a DP is required. Specific procedures shall include: a note placed in the Take-Off Minimums and (Obstacle) Departure Procedures section of the Terminal Procedures Publication (TPP) to enable the pilot to see and avoid obstacles that require a climb gradient (CG) (see paragraph 835d(2)(a)4 and TERPS Chapter 12); mandatory ceiling and visibility minimums to allow obstacles to be seen and avoided; establishment of standard takeoff minimums with required CG's; detailed textual or graphic flight maneuvers; a combination of these methods; or denial of an instrument departure. See table 4-1 for allowable combinations relating to specific situations.

(1) A ceiling and visibility shall not be published for obstacles identified under TERPS paragraph 1205d. See table 4-1, situation 2.

(2) Where CG's are required for obstacles within and also beyond **3 SM** of DER, publish a graphic DP. Where operationally practicable, CG's may be combined with publication of the more demanding CG's to an altitude that clears all obstructions.

(3) Whenever mandatory ceiling and visibility are used to allow obstacles to be seen and avoided, they shall be accompanied by an alternative to use standard take-off minimums with a minimum required climb gradient

TABLE 4-1

SITUATION	ACTION
1) TERPS obstacle assessment does not identify any obstacle penetrations; i.e., diverse departure evaluation successful.	No further action required - standard takeoff minimums apply.
2) TERPS obstacle assessment identifies only obstacles that require a CG to an altitude 200′ or less above DER.	Establish a DP which provides the pilot a note identifying the obstacle(s) type, location relative to the DER, height (AGL) and elevation.
3) TERPS obstacle assessment identifies obstacles that require a CG to an altitude greater than 200′ above the DER.	*A)* Obstacle **3 SM** or less from DER: establish a DP which provides the pilot a note identifying the obstacle(s) type, location relative to the DER, height (AGL) and elevation, and which specifies: 1) a ceiling and visibility to see and avoid the obstacle; with 2) standard takeoff minimums with a minimum CG to a specified altitude; and/or 3) provide a specific textual or graphic route to avoid the obstacle(s). Include takeoff minimums and/or CG's as necessary for each runway served. *B)* Obstacle greater than **3 SM** from DER: establish a DP for obstacle avoidance that uses standard takeoff minimums with a required CG; or provide a textual or graphic departure route to avoid the obstacle(s). **NOTE:** Include takeoff minimums and/or CG's on the graphic DP. If neither of these actions is feasible, an IFR departure shall not be authorized.

4) TERPS obstacle assessment identifies obstacles requiring a CG to 200′ or less above DER and additional obstacles that require a CG to an altitude greater than 200′ above DER.	Apply a combination of action items from 2) and 3) above as appropriate.

d. Least Onerous Route.

(1) When climb gradients greater than 200′/NM are required in conjunction with a detailed flight maneuver, the obstacle DP route shall be established over terrain or other obstacles which results in the lowest possible climb gradient for that runway or airport.

(2) Consideration shall be given to pilot workload and other aircraft performance requirements such as number of turns, NAVAID communication frequency changes, navigation system complexities, etc.

(3) It is essential that AVN-100 fully coordinate with the controlling ATC facility in the development of this routing to ensure flight safety is maintained; i.e., that the basic requirements of least onerous routing are not in conflict with existing ATC routing and airspace design/structure.

e. Order 8260.3, Chapter 12 requires application of diverse departure criteria to all runways authorized for instrument departures.

(1) Successful diverse criteria evaluation ensures that aircraft are capable of departing in any direction from a runway and a textual or graphic DP is not required for obstruction clearance. Therefore, standard takeoff minimums apply and a Form 8260-15 is not required.

(2) When the diverse criteria evaluation indicates a requirement for a specific departure routing for obstruction avoidance, develop a textual or graphic DP using the least onerous route to the en route structure. This procedure will be charted as the default IFR departure procedure for obstruction clearance. There shall only be **one** default DP developed for each runway. The default DP should be textually depicted; however, when a graphic depiction is required (see paragraph 471), the name of the default graphic DP for the pilot to use shall be stipulated on the Form 8260-15A in the "TAKE OFF MINIMUMS" section (see paragraph 835d(2)(a)4); e.g., "USE JONES DEPARTURE."

471. PUBLICATION.

a. When detailed flight maneuvers are established for obstacle avoidance or for ATC purposes, they are documented as "DEPARTURE PROCEDURES" on Forms 8260-15A, B, and C, as specified in paragraphs 833 and 835, or 8260-7. DP's required for obstacle avoidance may be either a stand alone textual or graphic procedure. Textual DP's are simple, may include a climb gradient requirement, and no more than one turn and/or altitude change. More complex DP's, involving climb gradient requirements, multiple turns, and/or altitude changes shall be graphically depicted. Develop RNAV DP's and DP's required for ATC purposes as graphic departures.

b. Departure procedures should place the aircraft in the en route strata expeditiously, but should also reflect the realities of ATC system requirements. AVN-100 shall coordinate with ATC to assure, whenever practicable, that departure procedures reflect the commonly used routing out of each airport. When ATC routing requirements are not a factor, develop the default DP based on the least onerous obstacle based routing to the en route system.

c. DP's shall accommodate ATC and obstacle clearance requirements with regard to minimum fix crossing altitudes and climb gradients. When application results in dual altitudes over a fix and/or dual CG's, both shall be documented on the appropriate Form 8260-15. Document the ATC altitude followed by the obstacle altitude in parenthesis; e.g., 9,000 (6,500). When ATC and obstacle altitude requirements are separated by 500′ or less, they may be combined and only the higher value charted as a minimum altitude. Climb gradient requirements shall be assumed to be the minimum required for obstruction clearance purposes unless annotated "ATC" in parenthesis; e.g., 400′/NM to 3,000; 450′/NM to 2,000 (ATC).

d. "Runway heading" is defined in the Pilot/Controller Glossary of the Aeronautical Information Manual (AIM) as "the magnetic direction that corresponds with the runway centerline extended, not the painted runway numbers." The glossary further

states that pilots cleared to "fly or maintain runway heading" are expected to fly or maintain the heading that corresponds with the extended centerline of the departure runway (until otherwise instructed by ATC), and are not to apply drift correction; e.g., RWY 4, actual magnetic heading of the runway centerline 044°, fly 044°.

e. Terminology.

(1) Departure instructions shall specify **"Climb runway heading...".** Alternatively, specific heading may be used if necessary to avoid obstacles.

(2) Do NOT use the terminology "Climb to (altitude)..." without including a heading to fly. INSTEAD, use **"Climb runway heading (or specified heading) to (altitude)...".**

(3) Do NOT use the terminology "Climb straight ahead...", as there is no guidance or reference definition of this phraseology for the pilot to apply.

472-479. RESERVED.

SECTION 8. STANDARD TERMINAL ARRIVAL ROUTES (STAR)

480. INTRODUCTION.

a. Air Route Traffic Control Centers (ARTCC) submit STAR's to AVN-100 through the regional ATD for review. ARTCC's are responsible for issuance of NOTAM's for STAR's.

b. AVN-100's review shall ensure obstacle clearance requirements; accuracy of courses, distances, and coordinates; clarity and practicality of the procedures; and assurance of navigational guidance adequacy. AVN-100 shall coordinate any discrepancies, required adjustments, or improvements noted during the review process and/or flight inspection with the sponsoring air traffic facility.

481. AVN-100 ACTION.

a. STAR's.

(1) Ensure that the STAR commences at a charted high or low altitude en route fix.

(2) Verify, in conjunction with flight inspection, that minimum en route altitudes provide required minimum obstruction clearance. altitudes (MOCA) and meet minimum reception altitudes (MRA), communication, and airspace requirements.

(3) Verify obstacle clearance requirements are met for lost communications instructions provided by the ARTCC. If the ARTCC did not provide lost communications instructions, and it is determined that obstacles/terrain present a potential problem, **coordinate** with the ARTCC for resolution of the matter.

(4) Incorporate, where possible, the STAR termination fix into the SIAP as a feeder/initial approach fix.

(5) Verify entry into maximum authorized altitude (MAA) from available documentation; e.g., flight inspection reports, expanded service volume (ESV) reports, etc.

b. General.

(1) Review from the pilot's standpoint. The procedure must be flyable and should be as simple as possible. Use clear, concise, and standard phraseology. Request flight inspection assistance.

(2) Ensure, in conjunction with flight inspection, that facility performance will support the procedure. This may require preparation of materials such as maps and ESV's to support facility flight inspection.

(3) Verify the accuracy of courses, distances, and coordinates.

(4) Return the signed form to the regional ATD for further processing.

(5) Retain a copy of each approved form with charts, computations, and supporting data to facilitate future reviews.

(6) Include normal distribution copies of Form 8260-2 for ATA-100 and ARTCC in the package forwarded to the regional ATD.

482-499. RESERVED.

CHAPTER 5. AIRSPACE

SECTION 1. OBSTRUCTION EVALUATION (OE).

500. GENERAL.

14 CFR Part 77 requires that the Administrator be notified prior to the construction or alteration of structures which might present a hazard to flight. Form 7460-1, Notice of Proposed Construction or Alteration, is the medium for that notification of construction or alteration.

501. RESPONSIBILITY AND PROCESSING OF FAA FORM 7460-1.

The Regional ATD has the responsibility to process all Forms 7460-1 in accordance with 14 CFR Part 77 and Order 7400.2, Procedures for Handling Airspace Matters. In this regard, AVN-100 shall ensure that a complete evaluation of the effect the proposed construction or alteration will have on IFR aircraft operations, including the visual portion of an IFR procedure, is provided to Air Traffic. AVN-100 shall also assist Air Traffic in reconciling possible discrepancies in IFR findings made by military services. Additionally, the Regional Flight Standards Division, All Weather Operations Program Manager, shall serve as the focal point for assessing VFR operational impact. Initial impact assessments should be made by the FPO and FSD. Headquarters-level case reviews shall be accomplished by AVN-100 (IFR) and AFS-420 (VFR).

502. REVIEW OF NOTICES.

AVN-100 and Flight Standards personnel normally involved in the evaluation of Notices of Construction or Alteration should be thoroughly familiar with applicable parts of Order 7400.2. The effect of a proposed structure on aircraft operations should be fully stated. Consultation with the appropriate FSDO and/or AVN-200 may be helpful in formulating recommendations. The following should be considered:

a. Effect on VFR Traffic. When requested by Air Traffic, Flight Standards shall assess the effect upon VFR routes, airports/terminal operations, or other concentrations of VFR traffic. Air Traffic is responsible, under Order 7400.2, for assessing VFR traffic pattern impact; Flight Standards provides assistance in this area as requested.

b. Terminal Area IFR Operations. AVN-100 shall assess the effect upon terminal area IFR operations to include approach/departure procedures, transitions, radar vectoring charts, holding patterns, and STAR's. The study shall assess the effect upon any segment of an existing or proposed instrument approach/departure procedure and any restrictions.

c. En Route IFR Operations. AVN-100 shall assess the effect upon en route IFR operations to include MEA's, MOCA's, MCA's, MHA's, MIA charts, and turning areas.

d. Accuracy. All studies shall be made assuming the obstruction will be built or modified to the height specified in the study. If the proposed obstruction qualifies as the controlling obstacle for an IFR procedure, re-evaluate the proposed structure for impact using a 4D accuracy code. This impact shall be forwarded to Air Traffic as the IFR impact. However, AVN-100 shall also provide the survey accuracy required to mitigate the impact; i.e., "a surveyed accuracy of 'xx' horizontally and 'xx' vertically will result in either reduced or no IFR impact." (See chapter 2, section 11.)

e. NAVAID Interference. When informed by Air Traffic that it has been determined by Airway Facilities and/or frequency management personnel, that there may be interference with facility performance, AVN-100 determines the effect upon any instrument flight procedure. This includes radio or NAVAID interference through inter-modulation, overload, spurious, or harmonic conditions which affect the receiver performance. Provide protection for all IFR areas and altitudes.

f. Adjustments to Instrument Flight Procedures. During negotiations with proponents or when requested by Air Traffic, AVN, or AFS, specialists should provide what procedure adjustments can be made to mitigate the effect without adversely affecting the procedure. AVN-100 shall not amend a procedure until receipt of the "Actual Notice of

Construction," or other notification relative to an obstacle which will have a procedural effect. If, during a procedural review or while on a site visit, it becomes obvious for safety reasons that the existence of a previously unknown obstacle requires procedure minimums to be increased, expedite accomplishment of the change by means of a NOTAM.

g. Statement of Adverse Impact. If the proposed construction or alteration will have an adverse effect on VFR or IFR aircraft operations, procedures, or minimum IFR flight altitudes, AVN-100 and Flight Standards evaluations should clearly state the extent of these effects. Air Traffic is responsible for making the final determination of whether adverse impacts are "substantial" or "minimal."

h. AC 70/7460-1 Obstruction Lighting and Marking. AVN-100 and Flight Standards personnel should be familiar with this advisory circular so that appropriate remarks can be made regarding the requirements therein. This is especially important where exceptions from lighting and marking standards have been requested by the applicant.

503. OBSTRUCTIONS UNDER SUBPART C, 14 CFR PART 77.

Construction or alterations identified as obstructions based on the standards of Subpart C, although not automatically hazards to air navigation, are presumed to be hazards to air navigation until an FAA study has determined otherwise.

SECTION 2. DESIGNATION OF CONTROLLED AIRSPACE

504. GENERAL.

To afford separation from other aircraft all instrument flight procedures shall be contained in controlled airspace to the maximum extent possible within the capabilities of the ATC system. DF procedures are exempt from this policy. For special procedures, refer to paragraph 402c.

505. AT RESPONSIBILITY.

It is the responsibility of the regional ATD to determine the type and amount of controlled airspace that can be established to encompass instrument flight procedures, including departures from the airport.

506. AVN-100 ACTION.

a. Determine airspace requirements for all original IAP's. Analyze IAP amendments which affect any fix, course, or altitude, to determine if existing airspace must be extended or can be reduced. Similarly, analyze IAP cancellations to determine if existing airspace can be reduced. AVN-100 shall coordinate with the ATC to determine if further procedure development needs to be delayed pending any airspace action.

b. AVN-100 analysis, in accordance with the provisions of this section, shall include, in part, a determination of the minimum required length and width of the Class B/C/D/E Surface Area extensions, and/or any Class E 700' airspace extension.

c. Document data, as described in paragraph 507k, on the Form 8260-9, Standard Instrument Approach Procedure Data Record, which supports the IAP being designed. (See paragraph 909 "Remarks" for forms completion guidance.) Forward this data to the appropriate regional AT office.

NOTE: This information may also be entered on any form considered acceptable by AVN-100 and the ATD; however, to avoid loss of data, it is strongly recommended that AVN *make the entry in* Form 8260-9, REMARKS, for *permanent record.*

507. TERMINAL AIRSPACE.

The following criteria shall be used to determine the required minimum length and width of Class B/C/D/E Surface Area and/or Class E 700' airspace extensions.

a. The requirement to designate controlled airspace is contained in Order 7400.2, Part 6.

b. The nearest 100' principle shall be applied in determining the height of the controlling terrain. Example: A terrain elevation of 249.99' MSL would be considered as 200'; 250.00' MSL as 300'.

NOTE: Use of the following computation methods MUST consider the primary area of all applicable segments of any IAP under analysis. Any arrival extensions must be the result of "worst-case scenario" analyses, reflecting the greatest amount of controlled airspace required.

c. Class B/C/D/E Surface Area Extensions. Establish an extension of the Class B/C/D/E Surface Area whenever an IAP authorizes descent to an altitude less than 1,000' above the surface at a point outside the basic surface area. Where multiple approach procedures are established utilizing the same approach course, the extension length and/or width shall be based on the approach, or approach combinations, requiring the greatest length and/or width respectively.

(1) Precision approach procedures. Where ILS/MLS procedures are involved, the 1,000' point is established by determining the elevation of the highest terrain in the final approach primary area. Add 1,000' to this figure and subtract the threshold/GPI elevation. Then divide the result by the GS tangent, and subtract the GPI to threshold distance. The result is the distance from the threshold to the 1,000' point (see figure 5-1).

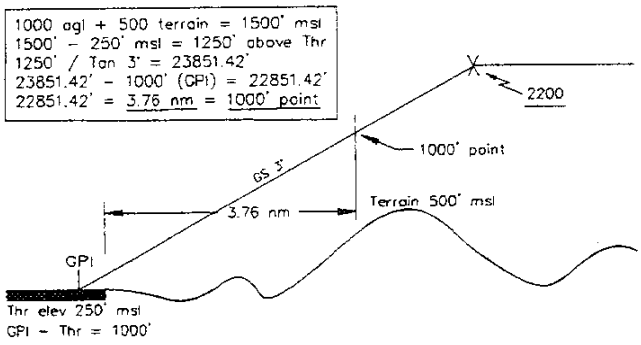


Figure 5-1

(a) When the GS (or EL) is inoperative, the altitude for flying the LOC-only (or AZ-only) may require an additional Class B/C/D/E Surface Area (control zone) extension. Therefore, the 1,000' point for LOC-only (or AZ-only) should be determined in the same manner as for nonprecision SIAP's (see paragraphs 507c(2) through (4)).

(b) To locate a 1,000' point in a segment prior to the FAF, apply the provisions of paragraphs 507c(2) through (5).

(2) Nonprecision approach procedures. (NoPT w/FAF):

(a) When the SIAP specifies a minimum altitude at the FAF greater than 1,000' above the highest terrain in the final segment, the 1,000' point is assumed to be inbound from the FAF at a distance determined by application of a descent gradient of 500'/NM for distances in excess of 7 NM from runway threshold, and 300'/NM for distances at/less than 7 NM from the runway threshold; i.e., use both gradients to compute the 1,000' point when the final segment is longer than 7 NM (see figures 5-2 and 5-3).

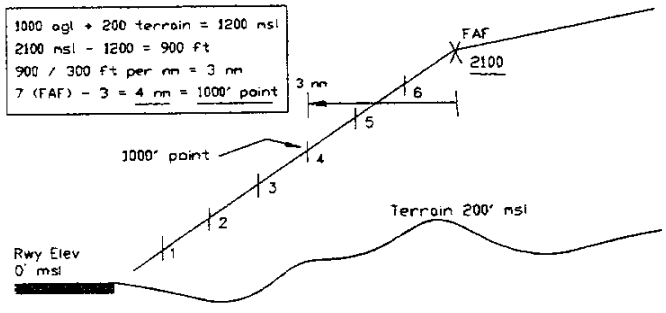


Figure 5-2

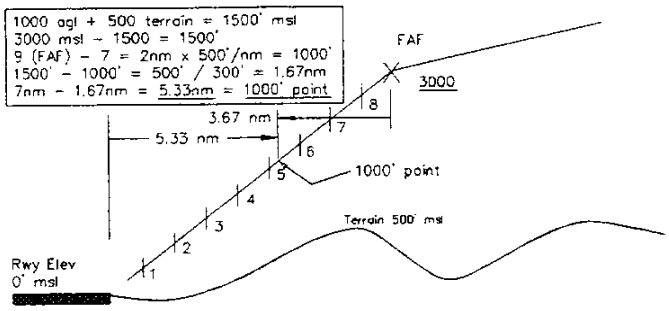


Figure 5-3

(b) When the SIAP specifies a minimum altitude at the IF greater than 1,000' above the highest terrain in the intermediate segment, the 1,000' point is assumed to be inbound from the IF at a distance determined by application of a 500'/NM descent from the IF (see figure 5-4).

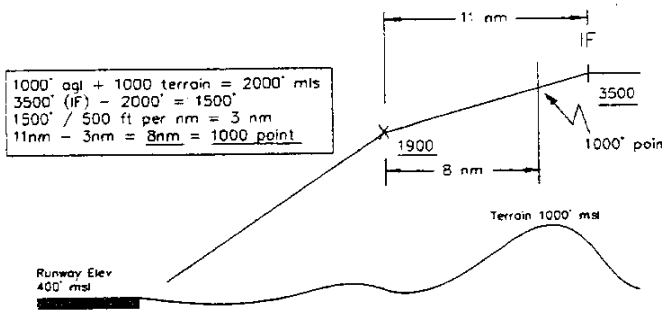


Figure 5-4

(3) Nonprecision approach procedures with Procedure Turn (PT):

(a) Procedure turn over facility (on-airport, no-FAF): Where a facility is located on the airport (NDB, VOR, VORTAC) and the SIAP does not incorporate FAF, the 1,000' point is assumed to be 7 NM outbound beyond the facility for a 10-mile PT, and 5 NM outbound for a 5-mile PT.

(b) Procedure turn over FAF:

1. When the SIAP specifies a minimum altitude at the FAF less than 1,000' above the highest terrain in the intermediate segment, the 1,000' point is assumed to be 7 NM outbound beyond the FAF for a 10-mile PT, and 5 NM outbound for a 5-mile PT (see figure 5-5).

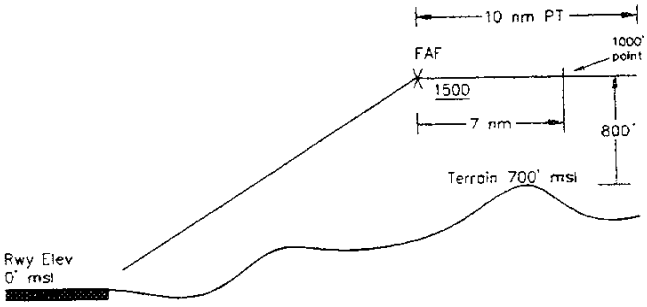


Figure 5-5

2. When the SIAP specifies a minimum altitude at the FAF less than 1,000' above the highest terrain in the final segment, BUT greater than 1,000' above the highest terrain in the intermediate segment, establish the 1,000' point at the FAF.

3. When the SIAP specifies a minimum altitude at the FAF greater than 1,000' above the highest terrain in the final segment, establish the 1,000' point as per paragraph 507c(2)(a).

(c) PT over facility/stepdown fix AFTER the FAF:

1. Where the SIAP specifies a minimum altitude at the FAF less than 1,000' above the highest terrain in the intermediate segment, the 1,000' point is assumed to be outbound beyond the FAF at a distance determined by application of a 200'/NM descent to the FAF (see figure 5-6).

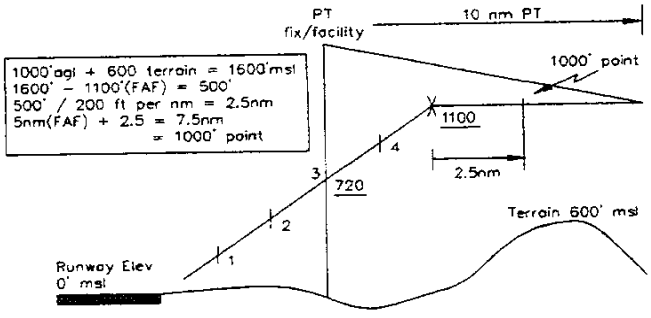


Figure 5-6

2. Where the SIAP specifies a minimum altitude at the final stepdown fix less than 1,000' above the highest terrain in the final segment, while specifying a minimum altitude at the FAF greater than 1,000' above the highest terrain in the intermediate segment, the 1,000' point is assumed to be inbound from the FAF at a distance determined by application of a 300'/NM descent gradient from the FAF. Use 500'/NM descent gradient for the distance that the FAF exceeds 7 NM from the threshold (see figure 5-7).

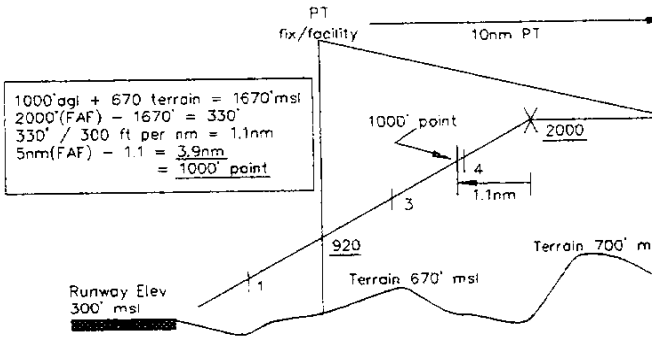


Figure 5-7

3. Where the SIAP specifies a minimum altitude at the final stepdown fix greater than 1,000' above the highest terrain in the final segment, the 1,000' point is assumed to be inbound from the final stepdown fix at a distance determined by application of a 300'/NM descent gradient from the final stepdown fix. Use 500'/NM descent gradient for the distance that the stepdown fix exceeds 7 NM from the threshold (see figure 5-8).

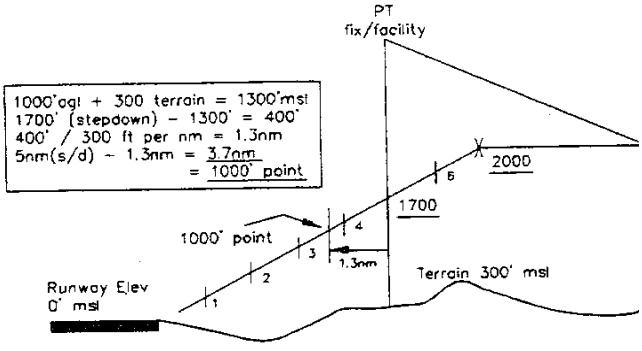


Figure 5-8

(d) Procedure turn over stepdown PRIOR to the FAF:

(Condition: Distance between the stepdown fix/facility and the FAF less than 5 NM - see TERPS paragraph 244d.)

1. If the PT **completion altitude** is equal to or greater than, BUT the minimum **altitude at the stepdown fix/facility** is less than 1,000' above the highest terrain in the segment underlying the course reversal, the 1,000' point is assumed to be 7 miles from the stepdown fix/facility on the PT inbound leg (see figure 5-9).

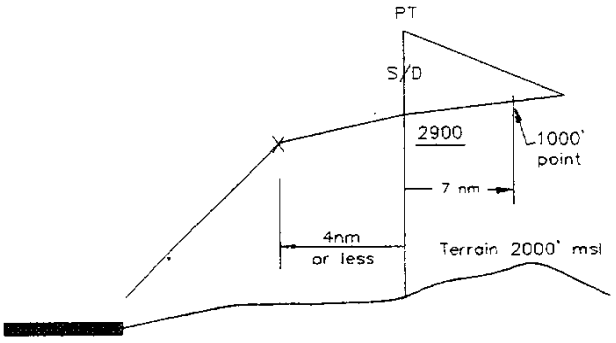


Figure 5-9

2. If the minimum **altitude at the stepdown fix/facility** is greater than 1,000' above the highest terrain in the segment between the fix/facility and the FAF, the 1,000' point is assumed to be inbound from the fix/facility at a distance determined by application of a 300'/NM descent from the stepdown fix/facility (see figure 5-10).

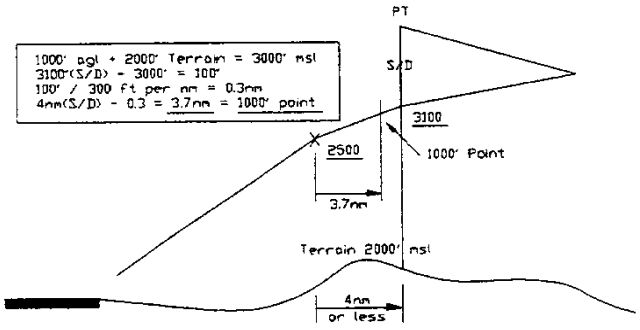


Figure 5-10

3. If the **1,000' point is inside the FAF**, apply methodology in paragraph 507c(2)(a).

(**Condition**: Distance between the stepdown fix/facility and the FAF greater than 5 NM - see Order 8260.3, paragraph 244e). Since the **fix/facility becomes the IF** in this case, apply methodology in paragraph 507c(3)(e).

Note: Where the distance between the stepdown fix/facility and the FAF equals 5 NM, either TERPS paragraph 244d or 244e may be applied; use the appropriate guidance above or below accordingly.

(e) PT over the IF: (Intermediate Fix)

1. If the PT completion altitude is less than 1,000' above the highest terrain in the segment underlying the course reversal, the 1,000' point is in the PT maneuvering area.

2. If the PT completion altitude is greater than or equal to 1,000' above the highest terrain in the segment underlying the course reversal, the 1,000' point is assumed to be 7 NM from the PT fix/facility on the inbound leg (see figure 5-11).

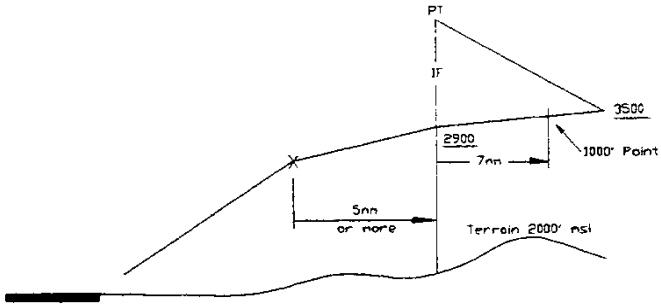


Figure 5-11

3. If the minimum **altitude at the IF** is greater than 1,000' above the highest terrain in the segment underlying the course reversal, BUT less than or equal to 1,000' above the highest terrain in the intermediate segment, the 1,000' point is at the IF (see figure 5-12).

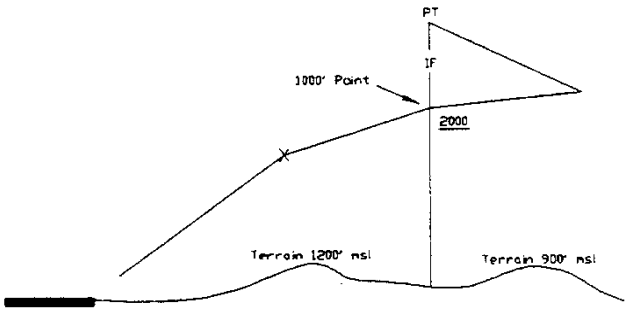


Figure 5-12

4. If the minimum **altitude at the IF** is greater than 1,000' above the highest terrain in the intermediate segment, the 1,000' point is assumed to be inbound from the IF at a distance determined by application of a 500'/NM descent from the IF (see figure 5-13).

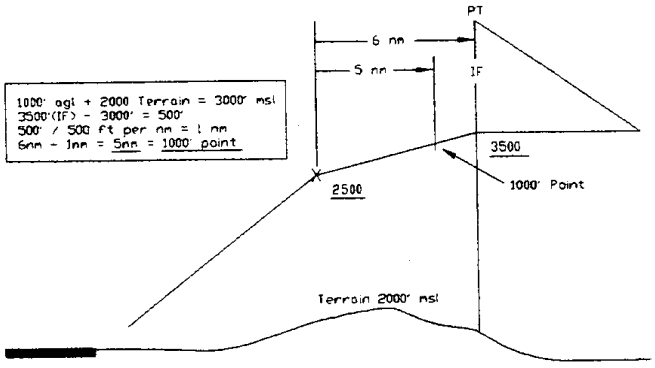


Figure 5-13

5. If the **1,000' point is inside the FAF,** apply methodology in paragraph 507c(2)(a).

(4) Hold-in-Lieu-of Procedure Turn:

(a) At the FAF:

1. If the minimum **altitude at the FAF** is 1,000' above the highest terrain in the final segment, the 1,000' point is at the FAF (see figure 5-14).

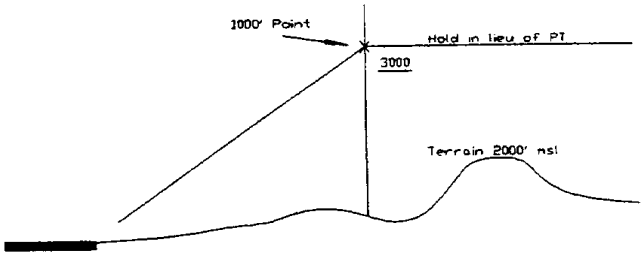


Figure 5-14

2. If the minimum **altitude at the FAF** is greater than 1,000' above the highest terrain in the final segment, apply the methodology in paragraph 507c(2)(a).

3. If the **minimum hold-in-lieu-of-PT altitude** is equal to or greater than, BUT the minimum altitude at the FAF is less than 1,000' above the highest terrain underlying the course reversal, the 1,000' point is assumed to be in the holding pattern area. The Class B/C/D/E Surface Area **(control zone)** extension must encompass the entire holding pattern primary area (see figure 5-15).

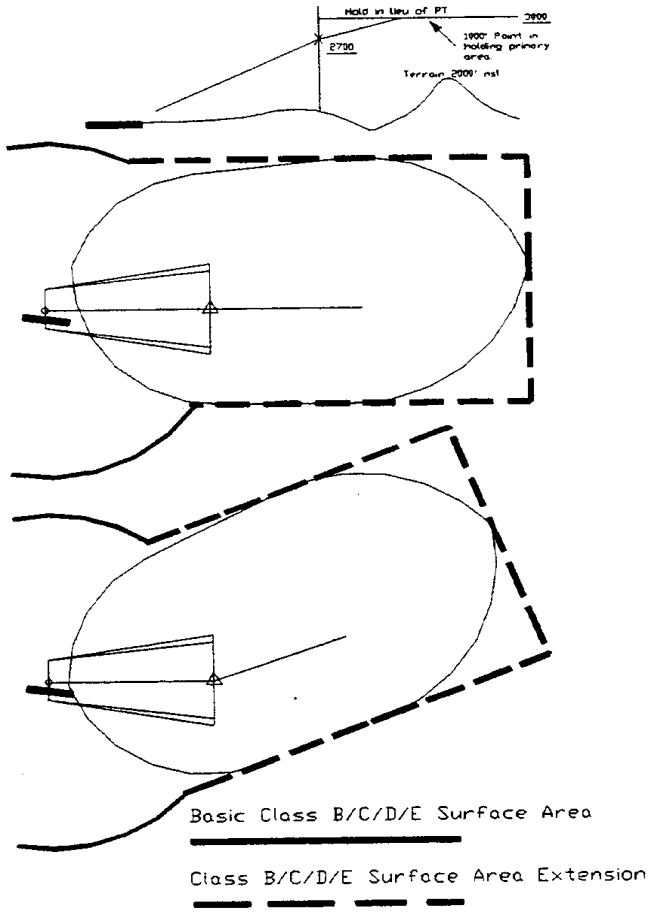


Figure 5-15

(b) At the IF:

1. If the minimum altitude at the IF is less than or equal to 1,000' above the highest terrain in the intermediate segment, the 1,000' point is at the IF (see figure 5-16).

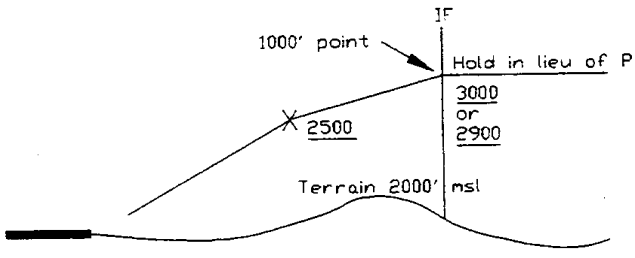


Figure 5-16

2. If the minimum **altitude at the IF** is greater than 1,000' above the highest terrain in the intermediate segment, the 1,000' point is assumed to be inbound from the IF at a distance determined by application of a 500'/NM descent from the IF (see figure 5-17).

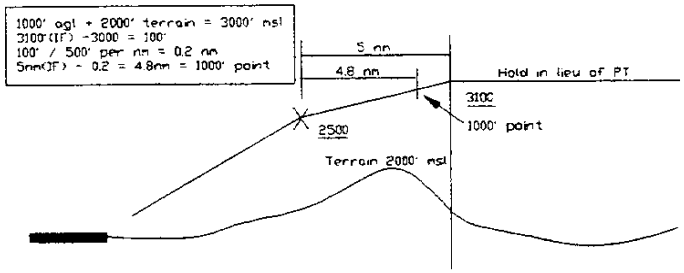


Figure 5-17

3. If the minimum altitude at the IF AND at the FAF are greater than 1,000' above the highest terrain in the intermediate segment, apply the methodology in paragraph 507c(2).

(5) General: For PT distances greater than 10 NM (out to 15 NM maximum), increase the distance to the assumed 1,000' point 1 NM for each mile in excess of 10 NM.

d. Class B/C/D/E Surface Area extension width.

(1) ILS/MLS: The width of the Class B/C/D/E Surface Area extension for ILS/MLS is established by determining the width of the precision final approach primary area at the point the aircraft reaches 1,000' AGL (see paragraph 507c(1)). The width of the extension shall not be less than 2 NM (1 mile each side of the localizer/azimuth course) regardless of the width of the precision primary area at the 1,000' point.

(a) Refer to figure 5-18. If the aircraft reaches 1,000' AGL at point A, the width of the surface area at point A is the same as the measured width of the ILS trapezoid at this point. Apply the provisions of paragraph 507c(1) to determine the distance from the threshold to the 1,000' point; then subtract 200'. The resultant figure is then used as "D" in the precision for determining the half-width of the precision primary area:

1/2W = .15D + 500'.

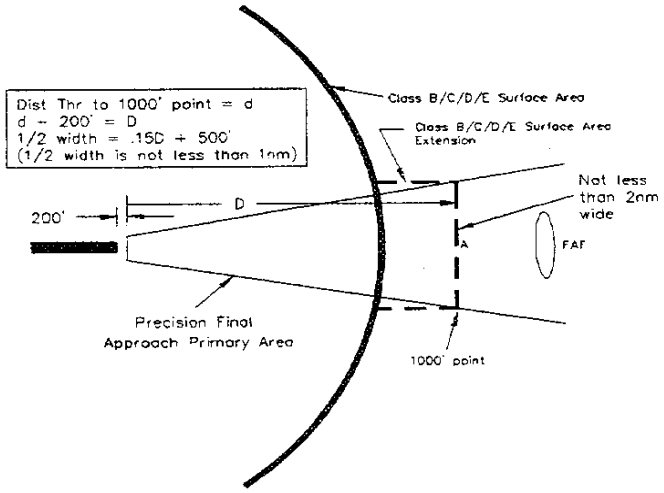


Figure 5-18

(b) Where the 1,000' point is located in the intermediate segment, additional analysis is required. Since the ILS or MLS FAF and the underlying LOC or AZ FAF may not be collocated, the respective intermediate segments may have different widths at any particular distance from the FAF. The **width** of the Class B/C/D/E Surface Area extension at the 1,000' point shall be the **greater** of the two segment widths. Use the guidance in TERPS chapter 2 for calculating the respective widths.

(2) Nonprecision: The width of the Class B/C/D/E Surface Area extension for other than ILS/MLS is established by measuring the width of the final approach primary area at the widest point between the surface area boundary and the 1,000' point. For final segments which expand toward the basic surface area boundary, the width is measured perpendicularly to centerline at the point where the course crosses the surface area boundary. Where Class B/C/D/E Surface Area has not been established prior to IAP development, obtain a tentative surface area dimension from the regional ATD for application of this paragraph. The width of the extension shall not be less than 2 NM (1 NM each side of segment centerline) (see figure 5-19).

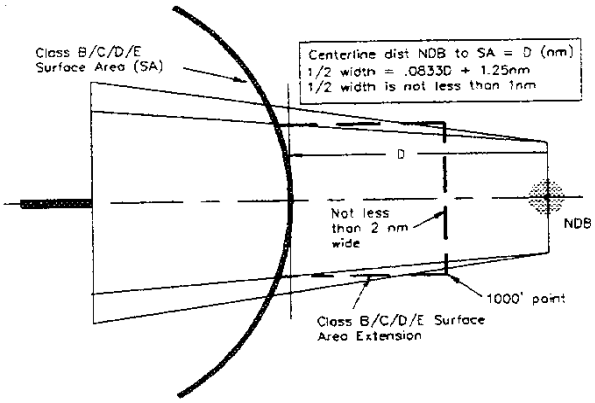


Figure 5-19

Where the 1,000' point is located in the intermediate segment, determine the segment width abeam the 1,000' point using the appropriate guidance in TERPS chapter 2.

e. Class E 700' airspace arrival extensions. A 700' Class E airspace extension should be established whenever a SIAP authorizes descent to less than 1,500' AGL. The **width** of the Class E 700' airspace extension is established equal to the width of the initial, intermediate, or final primary area at the widest point between the basic Class E 700' airspace and the point where the aircraft descends below 1,500' AGL. The methods used to locate the 1,500' point in a **precision final** are similar to those used to locate the 1,000' point. Refer to paragraph 506c(1) and use 1,500' in place of 1,000'. For **other precision segments, or for LOC/AZ,** refer to paragraphs 507e(1) through (3).

(1) No PT: Apply the methodology contained in paragraphs 507c(2)(a) and (b); except, where a 300'/NM descent gradient was used, apply a 500'/NM for the 1500' point determination. In figure 5-20, the aircraft will reach 1,500' AGL at 6 miles prior to the FAF using a 500'/NM descent gradient from the IF (see figure 5-20).

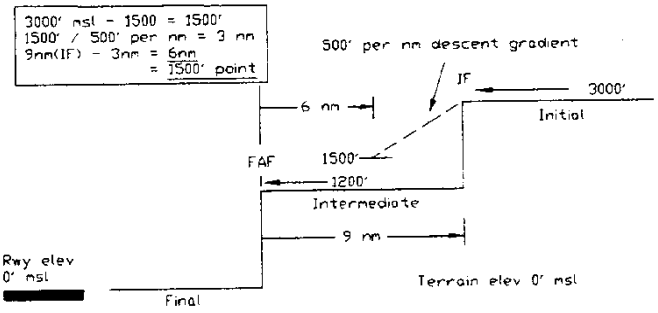


Figure 5-20

(2) Procedure Turn:

(a) On-airport no-FAF: For a **10-mile PT**, the 1,500' point is assumed to be 7 miles from the PT fix or facility on the inbound leg. Similarly, for a **5-mile PT,** the 1,500' point is assumed to be 5 miles from the PT fix or facility. HOWEVER, if the **PT completion altitude** is less than 1,500 feet above the highest terrain in the final segment underlying the course reversal, then the 1,500' point is in the PT maneuvering area (see paragraph 507k(7) and figure 5-21).

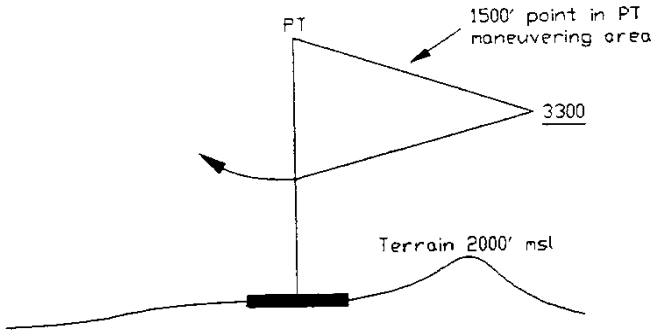


Figure 5-21

(b) PT over the FAF:

1. If the **PT completion altitude** is less than 1,500' above the highest terrain in the intermediate segment, the 1,500' point is in the PT maneuvering area (see paragraph 507k(7) and figure 5-22).

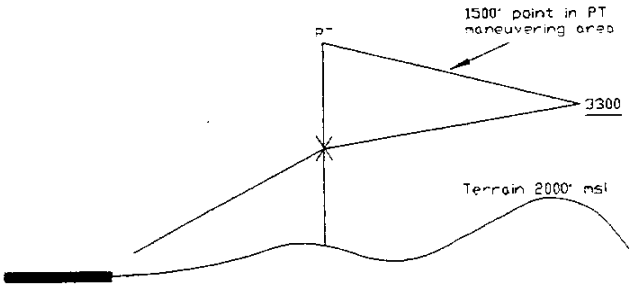


Figure 5-22

2. If the **PT completion altitude** is 1,500' or more above the highest terrain in the intermediate segment, the 1,500' point is assumed to be 7 miles from the PT fix or facility on the PT inbound leg (5 NM for a 5-mile PT) (see figure 5-23).

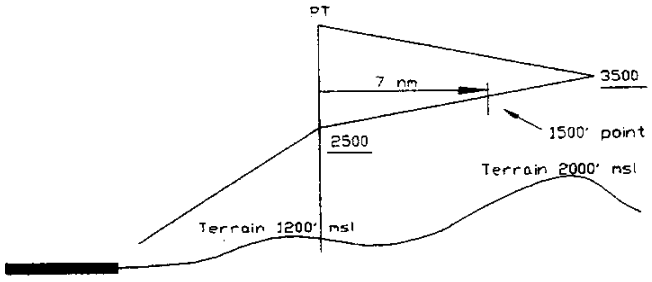


Figure 5-23

3. If the **FAF altitude** is greater than 1,500' above the highest terrain in the final segment, the 1,500' point is assumed to be inbound from the FAF at a distance determined by application of a 500'/NM descent gradient (see figure 5-24).

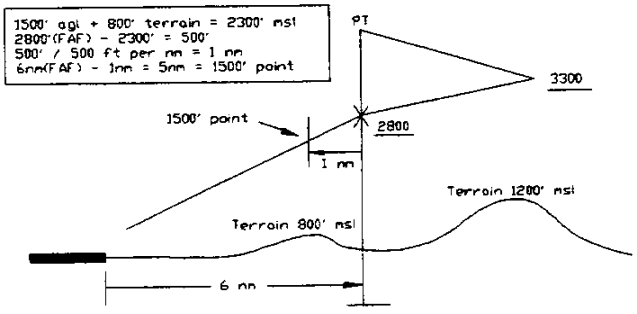


Figure 5-24

(c) PT over a stepdown fix AFTER the FAF:

1. If the **PT completion altitude** is less than 1,500' above the highest terrain in the segment underlying the course reversal, the 1,500' point is in the PT maneuvering area (see paragraph 507k(7) and figure 5-25).

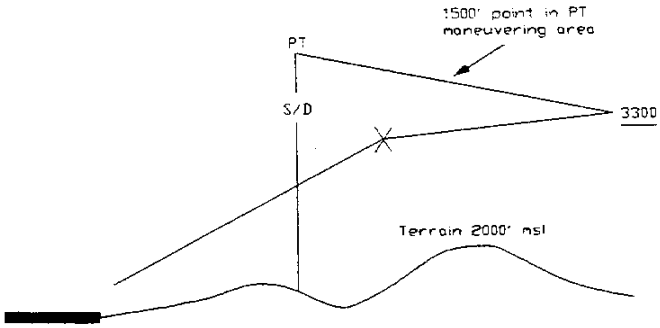


Figure 5-25

2. If the **PT completion altitude** is 1,500' or more above the highest terrain in the segment underlying the course reversal, the 1,500' point is assumed to be 7 miles from the PT fix or facility on the PT inbound leg (5 NM for a 5-mile PT) (see figure 5-26).

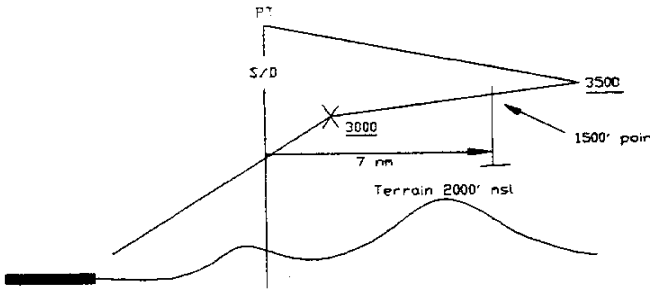


Figure 5-26

3. If the **FAF altitude** is 1,500' or more above the highest terrain in the segment underlying the course reversal or the final segment, the 1,500' point is assumed to be inbound from the FAF at a distance determined by application of a 500'/NM descent gradient (see figure 5-27).

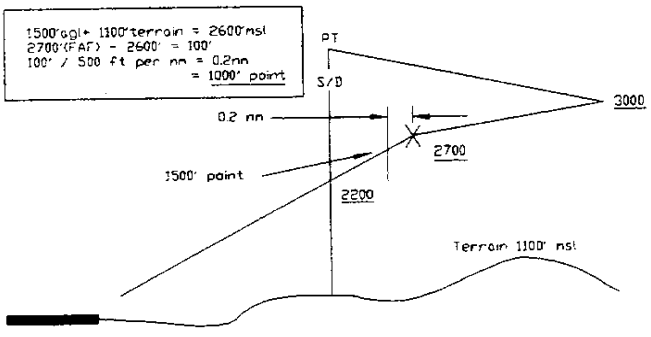


Figure 5-27

4. If the **stepdown fix/facility altitude** is 1,500' or more above the highest terrain in the final segment, the 1,500' point is assumed to be inbound from the stepdown fix/facility at a distance determined by application of a 500'/NM descent gradient (see figure 5-28).

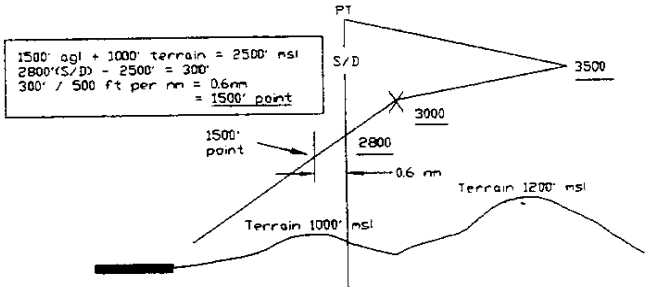


Figure 5-28

(d) PT over a stepdown fix PRIOR to the FAF:

(Condition: Distance between the stepdown fix/facility and the FAF less than 5 NM - see TERPS paragraph 244d)

1. If the **PT completion altitude** is less than 1,500' above the highest terrain in the segment underlying the course reversal, the 1,500' point is in the PT maneuvering area (see paragraph 507k(7) and figure 5-29.

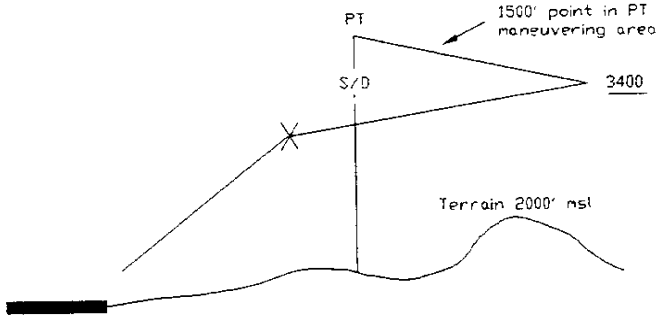


Figure 29

2. If the **PT completion altitude** is equal to or greater than, BUT the minimum altitude at the stepdown fix/facility is less than 1,500' above the highest terrain in the segment underlying the course reversal, the 1,500' point is assumed to be 7 miles from the stepdown fix/facility on the PT inbound leg (see figure 5-30).

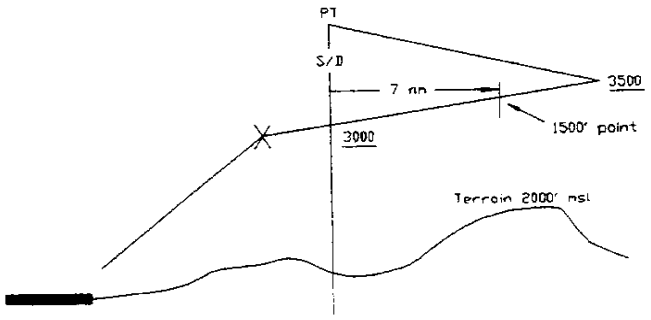


Figure 5-30

3. If the **stepdown fix/facility altitude** is 1,500' or more above the highest terrain in the segment between the fix/facility and the FAF, the 1,500' point is assumed to be inbound from the fix/facility at a distance determined by application of a 500'/NM descent gradient from the stepdown fix/facility (see figure 5-31).

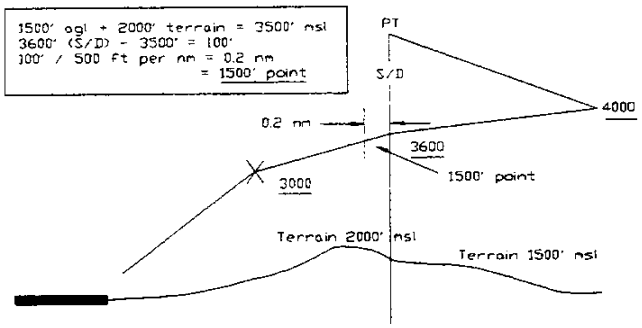


Figure 5-31

4. If the **1,500' point is inside the FAF,** apply the methodology in paragraph 507c(2)(a) using a 500'/NM descent gradient.

(**Condition**: Distance between the stepdown fix/facility and the FAF greater than 5 NM – see TERPS paragraph 244d). Since the **fix/facility becomes the IF** in this case, apply methodology for PT over the IF (see paragraph 507e(2)(e)).

NOTE: Where the distance between the stepdown fix/facility and the FAF equals 5 NM, either TERPS paragraph 244d or 244e may be applied; use the appropriate guidance in paragraph 507e(2)(d) or 507e(2)(e) accordingly.

(e) PT over the IF:

1. If the **PT completion altitude** is less than 1,500' above the highest terrain in the segment underlying the course reversal, the 1,500' point is in the PT maneuvering area (see paragraph 507k(7) and figure 5-32).

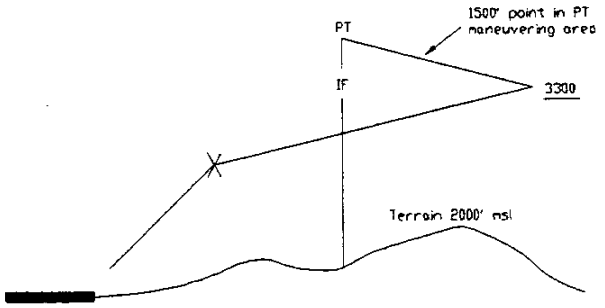


Figure 5-32

2. If the **PT completion altitude** is equal to or greater than 1,500' above the highest terrain in the segment underlying the course reversal, the 1,500' point is assumed to be 7 miles from the IF on the PT inbound leg (see figure 5-33).

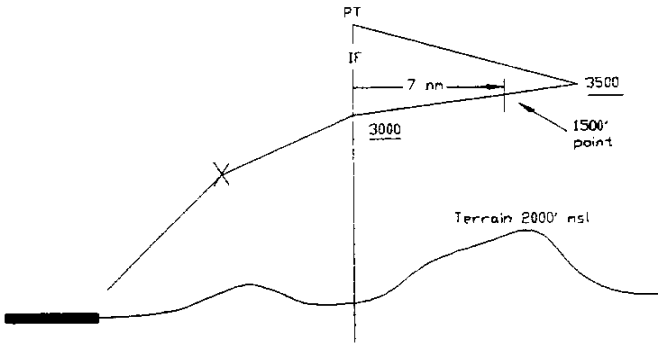


Figure 5-33

3. If the minimum **altitude at the IF** is equal to or greater than 1,500' above the highest terrain underlying the course reversal, BUT less than 1,500' above the highest terrain in the intermediate segment, the 1,500' point is at the IF (see figure 5-34).

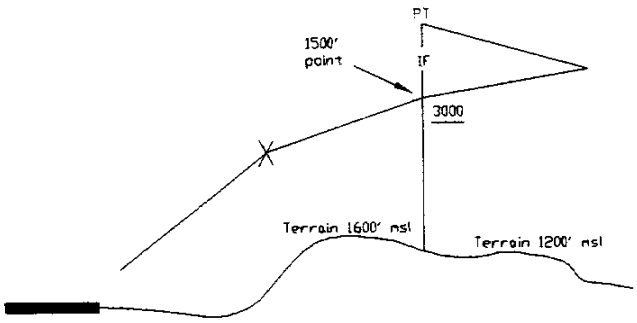


Figure 5-34

4. If the minimum **altitude at the IF** is greater than 1,500' above the highest terrain in the intermediate segment, the 1,500' point is assumed to be inbound from the IF at a distance determined by application of a 500'/NM descent gradient (see figure 5-35).

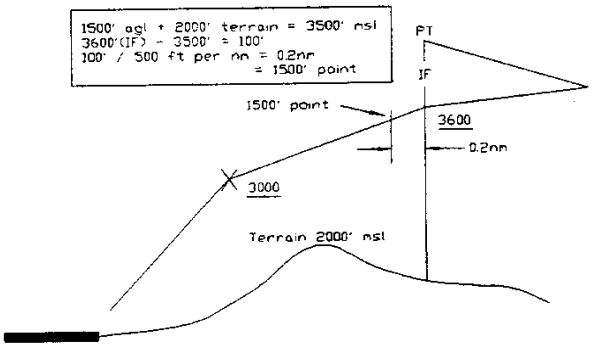


Figure 5-35

5. If the **1,500' point is inside the FAF,** apply the methodology in paragraph 507c(2)(b) using a 500'/NM descent gradient.

6. If the minimum **hold-in-lieu-of PT altitude** is equal to or greater than, BUT the minimum altitude at the FAF is less than 1,500' above the highest terrain in the segment underlying the course reversal, the 1,500' point is assumed to be in the holding pattern area. The Class E 700' airspace **(transition area)** extension must encompass the entire holding pattern primary area. Use the pattern size appropriate to the highest holding speed at the published holding altitude (see paragraph 507k(11) and figures 5-36 and 5-37).

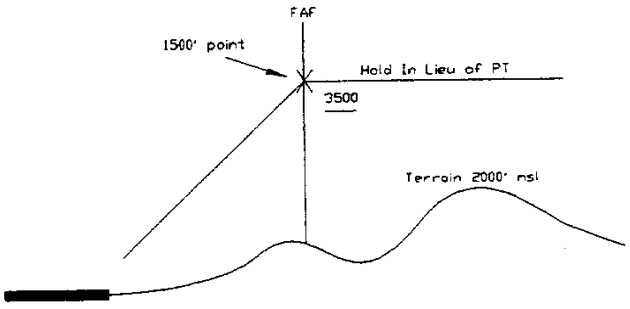


Figure 5-36

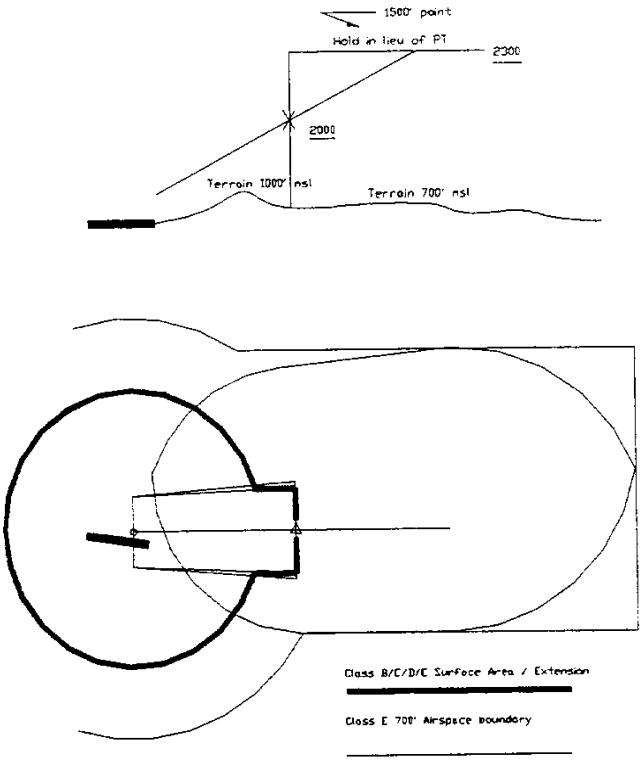


Figure 5-37

(f) At the IF:

1. If the minimum **altitude at the IF** equals 1,500' above the highest terrain in the intermediate segment, the 1,500' point is at the IF.

2. If the minimum **altitude at the IF** is less than 1,500' above the highest terrain underlying the holding pattern, the 1,500' point is in the holding pattern area. The Class E 700' airspace extension must encompass the entire holding pattern primary area. Use the pattern size appropriate to the highest holding speed at the published holding altitude (see paragraph 507k(7) and figure 5-38). Provide the appropriate AT office a drawing clearly depicting the airspace required (see paragraph 507k(11).

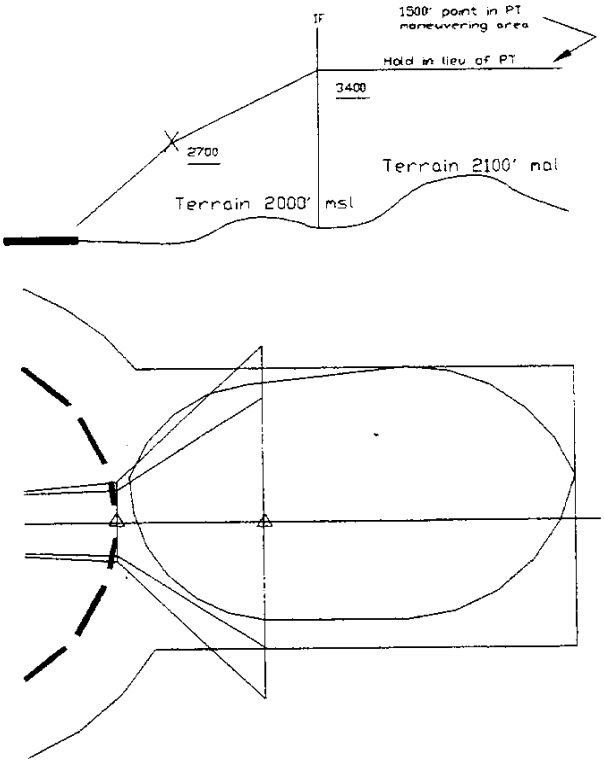


Figure 5-38

3. If the minimum **altitude at the IF** is greater than 1,500' above the highest terrain in the intermediate segment, the 1,500' point is assumed to be inbound from the IF at a distance determined by application of a 500'/NM descent gradient from the IF (see figure 5-39).

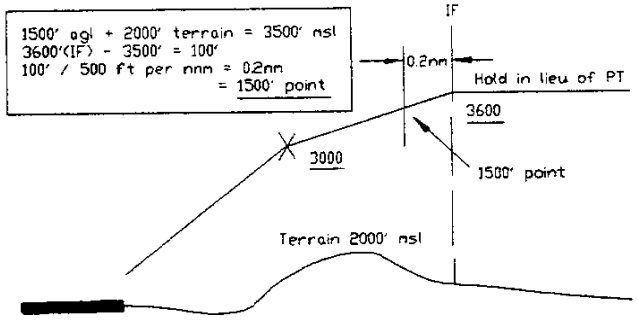


Figure 5-39

f. Missed Approach: Normally, it can be expected that the airspace required to encompass the IAP's or DP's at an airport will be sufficient to encompass that airspace required for missed approach procedures. This particularly applies to any need for Class B/C/D/E Surface Area extensions. Determine required airspace as follows:

(1) Draw the IAP missed approach segment areas on a sectional chart (or any other chart depicting controlled airspace).

(2) Establish a 700' Class E airspace area whenever an IAP authorizes aircraft operation at/below 1,500' AGL outside the basic Class B/C/D/E Surface Area. Where the clearance limit is reached prior to the 1,500' point, ensure the entire missed approach primary area is contained within Class E 700' airspace, including clearance limit holding, if required (see figure 5-40).

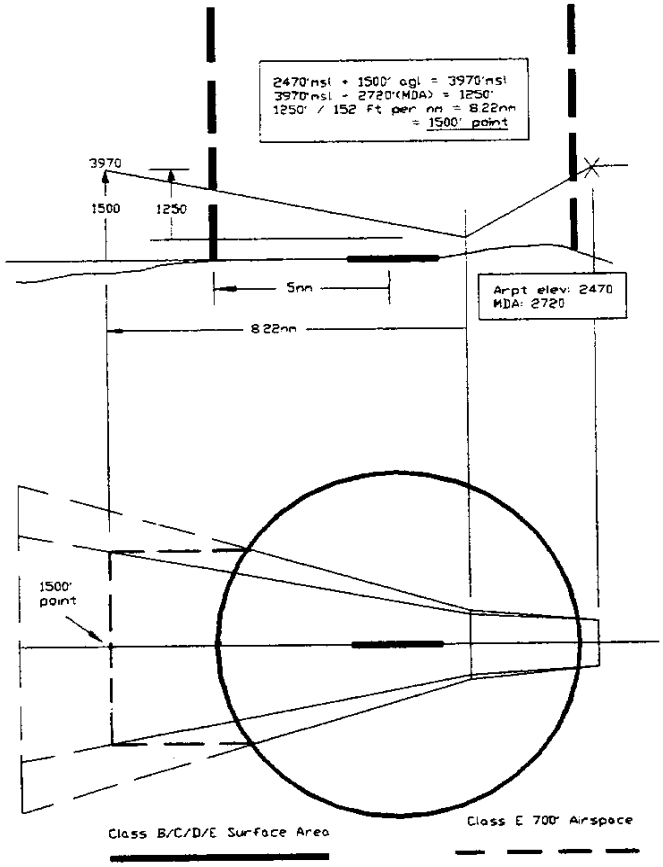


Figure 5-40

g. HI-VOR or NDB (No FAF).

(1) 1,000' Point:

(a) If the penetration turn completion altitude is equal to 1,000' above the highest terrain in the area prior to the 10-mile point, the 1,000' point is at the 10-mile point.

(b) If the penetration turn completion altitude is greater than 1,000' above the highest terrain in the area prior to the 10-mile point, the 1,000' point is assumed to be inbound from the turn completion point at a distance determined by application of a 500'/NM descent gradient.

(2) 1,500' point: Refer to TERPS table 2. The distance to the point of penetration turn completion and the "distance turn commences" from table 2 are assumed to be equal.

(a) If the penetration turn completion altitude is less than 1,500' above the highest terrain underlying the penetration turn, the 1,500' point is in the penetration turn area. Transition area boundaries must encompass the entire penetration turn area. Provide the appropriate ATC office a drawing clearly depicting the airspace required (see paragraph 507k(12)).

(b) If the penetration turn completion altitude is greater than or equal to 1,500' above the highest terrain underlying the penetration turn, AND less than 1,500' above the highest terrain in the straight segment prior to the 10-mile point, the 1,500' point is at the turn completion point.

(c) If the penetration turn completion altitude is greater than 1,500' above the highest terrain underlying the penetration turn in the straight segment prior to the 10-mile point, the 1,500' point is assumed to be inbound from the turn completion point at a distance determined by application of a 500'/NM descent gradient.

(d) If the FAF altitude is greater than 1,500' above the highest terrain in the final segment, apply the methodology in paragraph 507c(2)(a) using a 500'/NM descent gradient from the FAF.

h. HI-TACAN, VOR/DME, or VOR (with FAF).

(1) 1,000' Point:

(a) If the penetration turn completion altitude is greater than 1,000' above the highest terrain in the segment prior to the IF, the 1,000' point is assumed to be inbound from the turn completion point at a distance determined by application of a 500'/NM descent gradient.

(b) If the penetration turn completion altitude equals 1,000' above the highest terrain in the segment prior to the IF, the 1,000' point is at the IF.

(c) If the IF altitude is greater than 1,000' above the highest terrain in the intermediate segment, the 1,000' point is assumed to be inbound from the IF at a distance determined by application of a 500'/NM descent gradient.

(d) If the **FAF altitude** is greater than 1,000' above the highest terrain in the final segment, apply the methodology in paragraph 507c(2)(a).

(2) 1,500' Point:

(a) If the penetration turn completion altitude is less than 1,500' above the highest terrain between the turn completion point and the IF, the 1,500' point is in the penetration turn area.

(b) If the penetration turn completion altitude equals 1,500' above the highest terrain between the turn completion point and the IF, the 1,500' point is at the turn completion point.

(c) If the penetration turn completion altitude is greater than 1,500' above the highest terrain between the turn completion point and the IF, the 1,500' point is assumed to be inbound from the turn completion point at a distance determined by application of a 500'/NM descent gradient.

(d) If the IF altitude is greater than 1,500' above the highest terrain in the intermediate segment, the 1,500' point is assumed to be inbound from the IF at a distance determined by application of a 500'/NM descent gradient.

(e) If the FAF altitude is greater than 1,500' above the highest terrain in the final segment, apply the methodology in paragraph 507c(2)(a) using a 500'/NM descent gradient from the FAF.

i. Radar vector to FAF (Radar Required).

(1) If the FAF altitude is greater than 1,000' above the highest terrain in the final segment, apply the methodology in paragraph 507c(2)(a).

(2) **If the FAF altitude** is less than 1,000' above the highest terrain in the final segment, the 1,000' point is located PRIOR to the FAF (see paragraph 507k(4)).

(3) **If the FAF altitude** is greater than 1,500' above the highest terrain in the final segment, apply the methodology in paragraph 507c(2)(a) using a 500'/NM descent gradient from the FAF.

(4) **If the FAF altitude** is less than 1,500' above the highest terrain in the final segment, the 1,500' point is located PRIOR to the FAF (see paragraph 507k(7)).

j. **Radar vector to IF** (Radar Required).

(1) **If the IF altitude** is greater than 1,000' above the highest terrain in the intermediate segment, apply the methodology in paragraph 507c(2)(b).

(2) **If the IF altitude** is less than 1,000' above the highest terrain in the intermediate segment, the 1,000' point is located PRIOR to the IF (see paragraph 507k(4)).

(3) **If the IF altitude** is less than 1,500' above the highest terrain in the intermediate segment, the 1,500' point is located PRIOR to the IF (see paragraph 507k(7)).

(4) **If the 1,500' point is at/inside the IF,** apply the methodology in paragraph 507e(2)(b).

k. **Information to be forwarded to ATC:** See also paragraphs 506c and 909c(6).

(1) **ARP coordinates**; threshold coordinates (if straight-in authorized).

(2) **FAF or IF coordinates.**

(3) **Distance from ARP** (for circling-only), runway threshold (for straight-in), FAF, or IF to the 1,000' point. If applicable, state: **"1,000' point located outside FAF** (or IF) **- see current MVA Chart,"** and leave (5) blank.

(4) **Width of the segment primary area** at the widest point between the Class B/C/D/E Surface Area (control zone) and the 1,000' point; and the highest terrain elevation in the segment containing the 1,000' point (see paragraph 507d(2) and figure 5-19).

(5) **True course** (to the hundredth of a degree) of the segment in which the 1,000' point is located.

(6) **Distance from ARP** (for circling-only), runway threshold (for straight-in), FAF, or IF to the 1,500' point. If applicable, state: **"1,500' point located in the PT maneuvering area"**; or **"1500' point located in holding pattern area"**; or **"1,500' point located outside IF - see current MVA Chart"**; or **"1,500' point located outside FAF - see current MVA Chart"**; and leave (7) blank. (The regional AT office will then establish the transition area in accordance with Order 7400.2)

(7) **Width of the segment primary area** at the widest point between the Class E 700' airspace (transition area) and the 1,500' point; and the highest terrain elevation in the segment containing the 1,500' point (see paragraph 507e).

(8) **True course** (to the hundredth of a degree) of the segment in which the 1,500' point is located.

(9) **Highest terrain elevation in the PT** (or hold in lieu of PT) primary area excluding entry zone. Include holding pattern size.

(10) **For high-altitude penetrations**, paragraphs 507k(1) through (9), except paragraph 507k(2), apply. If applicable, state: **"1500' point located in the penetration turn area,"** and leave (8) blank.

l. **SIAP Adjustment**: Where the SIAP will not be derogated, consideration should be given to adjusting altitudes whereby the designation of unnecessary controlled airspace can be eliminated. The adjustment of altitudes should not be made where the descent gradients are increased above optimum.

m. **Conversion:** The appropriate Air Traffic office will convert the submitted nautical mile computations to statute miles to determine the actual dimensions required in accordance with Order 7400.2. However, AVN-100 shall review airspace dockets to determine that the proposed airspace encompasses the appropriate portions of the IAP consistent with the data forwarded in accordance with paragraph 507k.

SECTION 3. AIRPORT AIRSPACE ANALYSIS

508. GENERAL.

a. Public Law 103-272, Sections 40103b.1 and 44502, contain the basic authority for the FAA to conduct airport airspace analysis studies which culminate in an FAA determination. In order for the FAA to fulfill its obligations pursuant to the Public Law, Title 14 CFR Part 157, Notice of Construction, Alteration, Activation and Deactivation of Airports, was promulgated. This regulation requires proponents of the civil airport projects not involving federal funds to give the Administrator reasonable prior notice of such proposals so that he/she may be advised as to the effects the proposal will have upon the safe and efficient use of airspace by aircraft.

b. Other airport projects which are subject to airport airspace analysis studies include those eligible for airport improvement programs which are submitted to the FAA pursuant to Order 5100.38A, Airport Improvement Program (AIP) Handbook; the Military Construction Program (MCP), submitted to the FAA for review pursuant to Public Law, and Department of Defense Directive 5030.17; the designation of instrument landing runways normally associated with airports under AIP agreements; changes in airport operating status from VFR to IFR; and changes to airport traffic patterns.

c. The provisions of Order 7400.2, Part 3, are applicable to all participating offices. Therefore, all Flight Standards and AVN-100 personnel directly involved in airport airspace analysis shall be familiar with Order 7400.2, and those general responsibilities specified in chapter 1, section 2, of this document.

509. AVN-100/AFS INPUTS IN ESTABLISHMENT OF AIRPORTS AND HELIPORTS.

Since the term "airports" includes small isolated airports (including ultralight flight parks), heliports, and large airports, the problems associated with proposed establishment of airports are varied. However, it may be stated that the AVN-100 and AFS studies of all proposed airports or heliports relates mainly to the safety aspects involved, the feasibility of proposed anticipated operations, and the practicality of establishing reasonable instrument approach and VFR flight procedures, where required. Any proposed nonstandard installation or facility must be thoroughly reviewed to determine if an adequate level of safety can be achieved.

AFS performs the flight safety review of airport proposals to determine whether aircraft operations can be conducted safely considering the proposal's effect on the safety of persons and property on the ground. When requested by the Airports Division, AFS provides an operational safety review for Airports Division approval of a modification of an airport standard. AFS determinations, including studies referred by AVN, will be provided to the OPR.

AVN is responsible for evaluation and comment on all airport proposals related to IFR impact. Routine coordination with the AFS point of contact is expected on joint studies.

a. Questions to be considered in the AVN-100/AFS Analysis. It is not intended that the study be confined to these questions. It is recognized that some proposals will present unique problems which cannot be anticipated. Rather, the questions are outlined here to stimulate thinking (some of them are not applicable to all proposals):

(1) Where is the closest landing area? Is it depicted on aeronautical charts?

(2) What type of activity is contemplated for the proposed landing area? Will a conflict with established instrument approach procedures result? With other airports?

(3) Will existing obstructions result in unrealistic minimums? Unrealistic effective runway lengths? Will existing or proposed man-made and/or natural objects in the vicinity of the airport affect the safety of flight operations?

(4) What is the proximity of the closest city or town? Are runways aligned to avoid populated areas, schools, hospitals, and to minimize noise complaints? Other airports in close proximity?

(5) Are runways aligned in consonance with wind rose data? Is instrument runway aligned with IFR wind rose data?

b. Heliport Establishment. All proposals for the establishment of heliports must be given an on-site operational evaluation as specified in Order 8700.1, Volume 2, chapter 61. Proposed heliports to be located in congested areas, or any rooftop heliport, should be evaluated by helicopter qualified operations inspectors.

c. Study Requirements. It must be recognized that some proposals will be acceptable from an airspace utilization point of view, but may be totally unacceptable from an operational safety standpoint. It is, therefore, important that a thorough study be performed and that AVN-100 and AFS positions be developed and forwarded to the appropriate Airports division/branch. A copy of this position should be forwarded to the other appropriate division or branch. This position should clearly state any operational limitations and restrictions that would be required, e.g., ingress/egress routes.

510. ALTERATIONS OF AIRPORTS OR HELIPORTS.

For the purpose of this order, "alteration" means realignment, activation, or deactivation of any runway layout, and/or associated taxiways, or any other substantial change to the surface of that part of an airport which is used or intended to be used for aircraft landing and taking off. Generally speaking, the contents of the previous paragraphs of this section are also applicable to proposed alterations. However, there is the additional consideration of effects on existing instrument approach procedures previously established for the airport. There is also the possibility of the need for relocation of associated navigation facilities.

511. DEACTIVATION OF AIRPORTS OR HELIPORTS.

For the purpose of this order, "deactivation" means the discontinuance of use of an airport or landing area permanently, or for a temporary period of one year or more. The FAA requires notice of deactivation of airports. However, AVN-100 and AFS have no authority to recommend approval or disapproval of such actions. It may be necessary in some cases to cancel approach procedures, or to recommend the relocation of previously associated airspace. Appropriate NOTAM's should, if required, be published and the closed airports should be marked in accordance with existing standards.

512. ASSISTANCE IN ZONING PROBLEMS.

From time to time, AVN-100 or AFS personnel may receive requests for assistance in the development of airport zoning acts (state) or ordinances (local). Such inquiries should be referred to airports personnel, and in the field to the appropriate airport engineer. It is FAA policy to advocate state and local legislation in the field of airport zoning in accordance with model acts prepared in cooperation with other National agencies, such as the Council of State Governments, the National Association of State Aviation Officials, and the National Institute of Municipal Law Offices. Airports personnel are well versed with the model legislation which has been developed, and have been instructed in the dissemination of the material contained therein.

SECTION 4. CONTROLLED FIRING AREAS

513. DESCRIPTION.

A controlled firing area is an area in which firing of ordnance, lasers, etc., is conducted under controlled conditions so as to eliminate the hazard to aircraft. Activity within such an area will be disseminated as a NOTAM.

514. ESTABLISHMENT OF CONTROLLED FIRING AREAS.

The FAA has the authority for final decision in regard to the establishment of controlled firing areas. However, this is not accomplished through publication of rules, regulations, or orders. Requests for these areas are coordinated and processed by representatives of ATC without rulemaking procedures.

515. PRECAUTIONS.

In controlled firing areas, the responsibility for safety will be entirely with the using organization, which will conduct its firing so as to eliminate the hazard to aircraft. Generally, the control necessary to assure safety to aircraft is dependent upon the type of activity, terrain, and other factors involved. The precautions required to eliminate the hazard must be determined individually for each activity requested. Minimum required precautionary measures are set forth in Order 7400.2, paragraph 840.

516. AVN-100 REVIEW AND COORDINATION.

a. Considerations. The following facts must be considered in the review and coordination of proposed controlled firing area letters of agreement:

(1) There are no flight restrictions within controlled firing areas.

(2) These areas are not depicted on aeronautical charts.

(3) All pilots are not aware of the locations of these areas.

b. Review. In view of the above, the restrictions and provisions should be carefully reviewed to ensure that all facts have been considered, and that an adequate level of safety will be maintained. The type and volume of IFR traffic are usually well known to ATC personnel. However, the type of local VFR operations is usually best known by Flight Standards personnel.

SECTION 5. RESTRICTED AREAS

517. GENERAL.

A restricted area is airspace designated under 14 CFR Part 73 within which the flight of aircraft, while not wholly prohibited, is subject to restriction. No person may operate an aircraft within a restricted area between the designated altitudes and during the time of designation without the permission of the using or controlling agency.

Obstacle Clearance. Restricted areas as such are not considered obstacles to the establishment of instrument flight procedures. However, obstacle clearance shall be provided over terrain and/or man-made obstacles within the restricted area which underlies the flight procedure clearance area.

518. LETTER OF PROCEDURES.

A letter of procedures between the using agency of a joint-use restricted area and the ATC facility (controlling agency) may be promulgated to allow nonparticipating aircraft to transit the restricted area when the area is not being used for its designated purpose.

519. RESERVED.

SECTION 6. ESTABLISHMENT, RELOCATION, OR DISCONTINUANCE OF RADIO NAVIGATION AIDS

520. CRITERIA AND GUIDELINES.

The criteria and guidelines for the establishment, relocation, or discontinuance of navigational aids affecting airspace are contained in Order 7031.2, Airway Planning Standard Number One Terminal Air Navigation Facilities and ATC Services.

521. AVN-100 ACTION.

Conduct studies to determine the effect of the proposed action on existing or proposed IFR flight operations. Forward the results of these studies and an AVN-100 position to the appropriate AT division/ branch.

522. AFS ACTION.

Conduct studies to determine the effect of the proposed action on operational safety as relates to existing or proposed visual flight operations. AFS will provide input to the appropriate AT division/branch relating to operational impact, and to other interested divisions on request.

523-599. RESERVED.

CHAPTER 6. MILITARY PROCEDURES

600. GENERAL.

FAA Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS), specifies that the U.S. Navy, Air Force, and Coast Guard are responsible for the establishment and approval of instrument procedures as well as the review and approval of radar MVA charts for airports under their respective jurisdiction. This responsibility also applies to the approval of deviations from standards.

a. U.S. Army procedural requirements shall be processed in accordance with Order 8260.15, U.S. Army Terminal Instrument Procedures Service.

b. U.S. Air Force procedural requirements shall be processed in accordance with Order 8360.32, U.S. Air Force Terminal Instrument Procedures Service.

c. Questions concerning U.S. Navy procedures shall be directed to the Naval Flight Information Group (NAVFIG); Washington Navy Yard; 1339 Patterson Ave., SE, Room 301; Washington, DC 20374-5088. Phone: (202) 433-3473.

601. REVIEW AND COORDINATION.

a. Military Procedures. Military instrument procedures are reviewed and coordinated in accordance with applicable military directives prior to submission for flight inspection. Review of the procedure to determine compliance with Order 8260.3 criteria or other approved 8260 series orders (except as noted in paragraph 600) is NOT an FAA responsibility. AVN-200 shall forward flight inspection comments regarding procedure design, flyability, etc., to the attention of the authority submitting the procedure(s).

b. Military Fixes. Military fixes are maintained in the National Data Base, accessed by FAA air traffic system computers for radar display, and used to develop aeronautical charts and avionics data bases. Therefore, it is imperative that the requirement to document and name fixes supporting military operations/procedures receive the same priority as Forms 8260-2 that support civil procedures. AVN-100 shall review submitted forms for accuracy, forward them for flight inspection, and process the forms as specified in Chapter 9.

602. FAA ACCEPTANCE.

FAA accepts military procedures for civil use unless the note **"Not for Civil Use"** is annotated on the procedure by the military.

603. ASSISTANCE.

Where a military command requests technical assistance concerning instrument procedure design, criteria, completion of FAA forms, or in determining an equivalent level of safety related to a waiver, AVN-100 shall honor the request commensurate with present workload.

604-699. RESERVED.

CHAPTER 7. PLANNING

SECTION 1. GENERAL

700. GENERAL.

a. The development of effective and efficient flight procedures is closely related to the facility establishment and airport programs, and requires active participation by Flight Standards and AVN-100's regional personnel in the planning, programming, and budgeting of navigation facilities and airport development plans. Instrument procedures often determine the alignment and location of navigation facilities as well as the location, marking, and lighting of airport landing and maneuvering areas.

b. The allocation of funds frequently depends on the determination that efficient procedures can be developed and can be justified on the basis of operational benefits (landing minimums) or safety improvements. Therefore, the operational planning associated with facility installations and airport development, particularly in large terminal areas, is one of the most important responsibilities of the Flight Standards, Flight Procedures, and Airspace Program.

SECTION 2. PLANNING STANDARDS

701. PLANNING STANDARDS.

a. Facility Establishment. Airway Planning Standards contain the criteria for the establishment of air navigation facilities. These criteria are based, in part, on air traffic demand since the volume of traffic provides a measurable indication of the need for air navigation facilities and other aeronautical services.

b. Standards Limitations. Airway Planning Standards do not, however, cover all situations which may arise and are not to be used as a sole determination in denying a service where there is a demonstrated operational or ATC requirement. An aeronautical requirement may exist for facilities that cannot be adequately measured by a consideration of air traffic demand alone. Similarly, air traffic demand does not in itself always constitute a requirement for an air navigation facility. These situations must be individually evaluated to determine whether the benefits to be gained are commensurate with the cost of the facility or service.

c. Benefit/cost ratios have been established by the office of Aviation Policy and Plans (APO). Phase I deals with determining the traffic activity using Airway Planning Standard Number One (APS-1). Phase II criteria are a comparison of the present value quantitative benefits of installing an air navigation facility, with the present value of the costs for establishing the aid. Phase II includes other factors such as weather, etc. In most instances, the establishment criteria, in addition to the traffic volume, require an operational improvement in the form of lower altitudes or reduced visibilities with respect to IFR operations or a safety benefit with respect to visual aids which are required to resolve known safety problems.

d. Responsibility. The primary responsibility for determining that a location meets the air traffic volume requirements rests with Air Traffic System Requirements Service (ARS-1). At the regional level, the responsibility for identifying improvements to operational minimums or for establishing safety requirements is jointly shared by AVN-100 and Flight Standards Service (AFS-1). Specific areas of responsibility are delineated in Chapter 1. However, each organization has unique skills and expertise which must, in many situations, be combined in a teamwork approach in the area of airport and navigational facility planning. AVN-100 personnel serve in a team leadership role for the region in developing and recommending improvements to IFR procedures, operational minimums, and associated facilities.

702. DETERMINATION OF OPERATIONAL BENEFITS/ IMPROVEMENTS.

a. General. An operational benefit/improve-ment is considered to exist:

(1) When IFR operations can be authorized where none existed previously;

(2) Where a reduction of IFR minimums on existing procedures can be achieved;

(3) Where an additional NAVAID will provide lower minimums than those authorized on existing adjacent facilities; or

(4) Where a reduction in minimums cannot be achieved, an improvement in operational safety can be demonstrated.

b. Criteria. A reduction of at least 100′ in descent altitude or a reduction of 1/4 mile in visibility requirements should be indicated to adequately support an operational benefit. Where a reduction of less than 100′ in descent altitude is anticipated, additional justification should be provided to show that other improvements in the overall operation can be achieved with the additional facilities. Such improvements might include simplification of operating procedures; reduction of flight time; improved course guidance; improved runway alignment; or elimination of criteria waiver, etc. Flight Standards and AVN-100 personnel are expected to provide this type of supporting information during the planning phases for new NAVAID's.

c. Determination. A final determination that the anticipated benefits can actually be achieved is necessarily dependent upon the demonstrated performance of the facility at the time of commissioning; however a reasonable evaluation can be made for planning purposes based on the best information available at the time.

SECTION 3. SAFETY ANALYSIS

703. PERFORMING A SAFETY ANALYSIS.

a. The Airway Planning Standards consider the programming of precision approach path indicator (PAPI) and runway end identifier lights (REIL) as visual aids provided the runway meets a minimum number of landings and a reasonable safety benefit versus cost can be established. Although not specifically considered in the planning standards for VFR use, an economy approach light system may be considered to resolve a safety problem where the cost of the system is commensurate with the improvement desired, and the REIL or PAPI will not provide the necessary service.

b. In those cases where visual aids are considered essential to operational safety and the runway does not meet the traffic volume requirement, additional justification should be developed highlighting the visual deficiencies as they exist and the improvements that will be achieved. AVN-100 personnel will recommend to, or assist, the Airports and Airways Facilities Divisions in developing the principal justification for programming visual aids at IFR airports.

c. Flight Standards regional and field personnel will provide input to the regional planning teams through the All Weather Operations (AWO) Program Manager for visual aids to correct deficiencies identified during their flight program activity, contact with the public, or during incident/accident investigations. Flight Standards will provide primary support for the planning of visual aids for safety improvements at VFR public use airports. The AWO/PM will review all division inputs for appropriateness and develop recommendations for the regional airports and facilities planning groups.

d. Determining visual aids safety benefits. Orders 7031.2, Airway Planning Standard Number One Terminal Air Navigation Facilities and ATC Services, and 7400.2, Procedures for Handling Airspace Matters, provide FAA personnel with the basic guidance for establishment and justification.

(1) There are a number of operational and environmental situations where visual reference deficiencies exist, and where improvements can be made by the installation of a visual aid system to enhance safety. Typical deficiencies include:

(a) Deceptive Approach Area. A situation in which the topography, landmarks, or lights underlying the approach path do not provide the pilot with an adequate visual reference plane on which to establish a proper approach to a runway. This includes open water, featureless terrain, dense tree growth, deceptive lights, or rapidly rising or falling terrain which presents an unbroken or indefinite surface lacking the contrast for depth perception and glide angle maintenance.

(b) Obstruction Clearance. A situation in which natural or manmade obstructions under, or penetrating, the approach surface makes pilot judgment of obstruction clearance difficult due to their orientation, irregular pattern, or obscurity due to inability to provide appropriate marking or lighting.

(c) Runway Identification. A situation in which environment surrounding an airport derogates the pilot's ability to instantaneously establish and maintain runway identification at 2 miles or less from the runway threshold within 90° of the runway centerline extended. Identification may be hampered by one of the following conditions:

1. Overriding Lights. A general preponderance of metropolitan or area lighting located within 2 miles of the circling approach area to the runway.

2. False Lights. A configuration of non-aviation lighting, underlying the approach surface, which presents to the pilot a false runway identification such as a well-lighted boulevard, expressway, or railroad yard which crosses the approach area at 45° or less to the runway centerline extended.

(d) Runway Alignment. A situation in which the runway lighting fails to provide alignment information sufficiently in advance to assure correct intercept of the extended runway centerline and subsequent approach. This situation may be divided into two types:

1. Intercept Guidance. Where straight-in visual approach to the runway is at an angle of 15° or more to the runway centerline extended and the line of sight to the runway lights is obstructed.

2. Circling Guidance. Where, due to terrain or technical considerations, the primary approach is aligned mainly downwind and the subsequent circling to the upwind requires positive alignment reference to preclude overrunning the runway centerline extended.

(e) **Nonprecision Straight-in Approach.** A runway to which a nonprecision straight-in approach has been authorized. Vertical guidance is necessary for stabilized descent from the MDA to the runway. The vertical guidance assists the pilot in maintaining a safe flightpath to the runway, thus avoiding premature descent which may result in landing short of the runway during weather visibility conditions at or near the authorized straight-in minimums.

e. **Flight Standards and AVN-100 personnel** will frequently be involved in airport planning studies in their respective areas of responsibility, which require analysis of the merit of adding various visual aids. In addition to the specialist's experience or input from other knowledgeable persons, the following should be considered in recommending a particular visual aid:

VISUAL AIDS USAGE TABLE

Operational Problem	PAPI/VASI	REIL	MALS	LDIN
Deceptive Approach Area	Very Effective	Ineffective	Effective	Very Effective
Obstruction Clearance	Very Effective	Ineffective	Ineffective	Limited Effectiveness
Runway Identification	Limited Effectiveness	Effective	Effective	Very Effective
Runway Alignment	Ineffective	Limited Effectiveness	Very Effective	Very Effective
Vertical Guidance	Very Effective	Ineffective	Ineffective	Ineffective
Turbojet Operations	Very Effective	Ineffective	Limited Effectiveness	Effective
Circling Guidance	Ineffective	Limited Effectiveness	Limited Effectiveness	Very Effective

NOTE: Omni-directional REIL may be considered for improving guidance to a circling runway if the unbaffled lights would not create a greater problem for operations on other runways.

SECTION 4. AIRWAY PLANNING

704. GENERAL.

a. The primary responsibility for the establishment, amendment, or deletion of airways/jet routes rests with Air Traffic Service based on air traffic demand and user requirements. AVN-100, both at the national and regional level, shall participate in airway planning with respect to navigational signal coverage over designated routes, development of MEA's and related data, and the siting of electronic facilities. Frequently terrain factors or site availability dictate the siting of an electronic facility; however, there are instances where the en route facility can be located so as to provide a terminal instrument approach capability in addition to the en route service.

b. AVN-100 should be cognizant of operational requirements and environmental conditions in the en route and terminal areas that need to be considered in order to develop sound recommendations for optimum facility siting. Situations will arise where AVN-100 considers that a change in airway planning is necessary or desirable. Such changes could result from facility restrictions, lack of facility coverage, need for lower MEA's, improvement in airway alignment, and elimination of criteria waivers, etc. Every effort should be made to develop recommendations in coordination with appropriate airway facilities and ATC so that full consideration of local problems will be reflected in regional planning.

SECTION 5. TERMINAL PLANNING

705. GENERAL.

a. Responsibility. The primary responsibility for identifying airport locations that qualify for new terminal navigational facilities (except radar) rests with AVN-100. AVN-100 is required to participate in terminal planning with respect to the type of facilities required for the intended operations, development of instrument procedures, operational minimums, and the establishment of priorities for procurement and installation of planned facilities. AVN-100 regional personnel should be cognizant of operational requirements and environmental conditions in the terminal areas that need to be considered in order to develop sound recommendations for facility selection and optimum facility siting. The AWO/PM will provide technical assistance to regional planning teams developing low weather (Category II/III) facilities, applying emerging technologies, or requiring expertise in determining if a waiver to a flight procedure is practical.

b. Planning Recommendations. AVN-100 regional personnel should identify potential improvements to IFR terminal operations to appropriate Air Traffic and Airports Division planners. Such recommended improvements could occur as a result of new facility restrictions, changes in airport operations, the need for improved instrument procedures, safety considerations, and elimination of criteria waivers.

706. REQUIREMENTS FOR OUTER COMPASS LOCATORS FOR NEW ILS INSTALLATIONS.

In achieving the goals of reducing the total establishment costs for instrument landing systems, emphasis has been placed on providing only those components and services which are essential to the basic operational need. In this respect, the compass locator has not been considered a required item for many new ILS locations and will be included as a component only where it is properly justified. This criteria specifies conditions that must be considered to properly justify the installation of compass locators in conjunction with new ILS facilities. The term **"transition"** is used for convenience throughout this section in lieu of feeder route and initial approach segment associated with instrument approach procedure construction.

a. General Criteria.

(1) Compass locators are not required at locations where satisfactory transitions can be established to the LOC course from supporting NAVAID's unless holding at the compass locator is required.

(2) Compass locators are not required in an airport surveillance radar (ASR) environment where radar service can be provided on a continuous basis. Where radar service is utilized for transitioning to the ILS, vectors to a point within the normal ILS clearance area are required to eliminate the procedure turn (NoPT). This does not impose a radar fixing requirement as a condition for executing the approach procedure.

(3) An outer marker (OM) by itself shall not be utilized to identify the point from which holding or procedure turn is to be executed (see paragraph 214).

(4) A procedure turn may be authorized from an intersection that overlies the OM or is established outside of the OM location. For planning purposes, the accuracy of the intersection should not exceed plus or minus one mile.

(5) Transitions shall not be established from outside of the normal clearance and buffer areas unless they have been flight checked and the minimum localizer clearance requirements are met. Where such a flight check is unsuccessful, an intersection must be established on the localizer course, or a lead-radial established within localizer coverage. When established on the localizer course, the transition route from a VOR or NDB must be predicated on a NAVAID or fix which does not utilize the localizer; i.e., the fix must stand alone on a localizer course for definition (see paragraph 905d(2) and figure 7-4. TERPS paragraphs 287a and 1761 apply.

(6) Transitions to the LOC course which permit a straight-in approach (NoPT) will be established in accordance with criteria for localizer

intercept angles and length of intermediate segment described in TERPS paragraph 922 and depicted in figure 7-3. Although criteria permit localizer intercept of 15° at one mile from the OM, it is recommended that all intercepts be established no less than 3 miles nor more than 10 miles from the OM. In no case, will a straight-in approach be authorized from a transition that proceeds from a facility/fix directly to an OM or compass locator at outer marker (LOM) unless the facility/fix is established on the localizer course.

b. Satisfactory Transitions. The standard for localizer usable distance/coverage is 18 miles within ± 10° of the localizer course, and 10 miles for that area between 10° and 35° either side of the course. In determining the need for a compass locator, facility performance data may not be available for the development of transitions. Figures 7-1, 7-2, 7-3, and 7-4 depict normal clearance areas with a 2-mile buffer area established around the perimeter. These figures will be used for determining the need for a compass locator during initial facility planning and for the development of original procedures when flight check data is not available. The following general guidelines will apply:

(1) **When a VOR or NDB fix exists** within the shaded area shown in figure 7-1, transitions may be established to a fix on the localizer course from which a procedure turn can be executed.

(2) **When a VOR or NDB is located** within the shaded area shown in figure 7-2 and a fix can be established at the OM location in accordance with paragraph 706a(4), a transition may be established to the fix from which a procedure turn can be executed.

(3) **When a VOR, NDB, or satisfactory fix** exists or can be established within the shaded area shown in figure 7-3, a transition may be established to the localizer course and a procedure turn is not required.

(4) **Criteria for fix accuracy** is contained in TERPS paragraph 287a. Minimum divergence angle for PT fix is 45°.

c. Locations that Qualify for a Compass Locator. In determining the need for a compass locator, the local traffic flow, location of supporting facilities, and local terrain features must be considered. A compass locator may be planned for new ILS installations where one or more of the following conditions exist:

(1) **In a non-radar environment** where a transition cannot be established in accordance with paragraph 706b.

(2) **In a non-radar environment** where satisfactory transitions can be established in accordance with paragraph 706b, but the flow of traffic is such that operational requirements cannot be satisfied and the lack of a compass locator would result in an unacceptable delay to arriving aircraft.

(3) **In a radar environment** where radar service cannot be provided on a continuous basis or where radar service will result in a prohibitive controller workload or would require additional positions and personnel to provide the radar service.

(4) **In an area of precipitous or unusual terrain** where special procedural design is required.

d. Approach Procedure Design. To the extent possible, ILS approach procedures shall be designed to eliminate the compass locator as a required facility for the execution of the approach. Transitions shall be established in accordance with the following:

(1) **Original Procedures.** In designing original procedures prior to ILS commissioning, transitions shall be limited to those which can be established in accordance with the general guidelines contained in paragraph 706b unless a compass locator is programmed.

(2) **Revised Procedures.** Following facility commissioning, additional transitions originating outside of the normal clearance and buffer areas may be established if they are found to be satisfactory through flight inspection evaluation.

(3) **Use of DME.** The use of DME to provide arc transitions or to provide additional means of identifying fixes can provide flexibility for users that are DME equipped. However, DME arc initial segments are not encouraged for reasons stated in paragraph 807g(4). DME fixes established where an arc transition intersects the ILS course shall be named. If DME is the only means of providing transitions or fixes, a compass locator should be provided.

e. Action. AVN-100 regional personnel should make a map study at all planned or programmed ILS locations to determine if a compass locator is required. Priority should be given to approved ILS projects. Following this determination, all requirements for locators shall be included in the F&E budget or submitted as a reprogramming action. Justification for each locator shall be provided by AVN-100 by including an appropriate statement for each location as follows:

(1) Non-radar location - conforms to Order 8260.19, paragraphs 706c(1) and (2).

(2) Radar location - conforms to Order 8260.19, paragraph 706c(3).

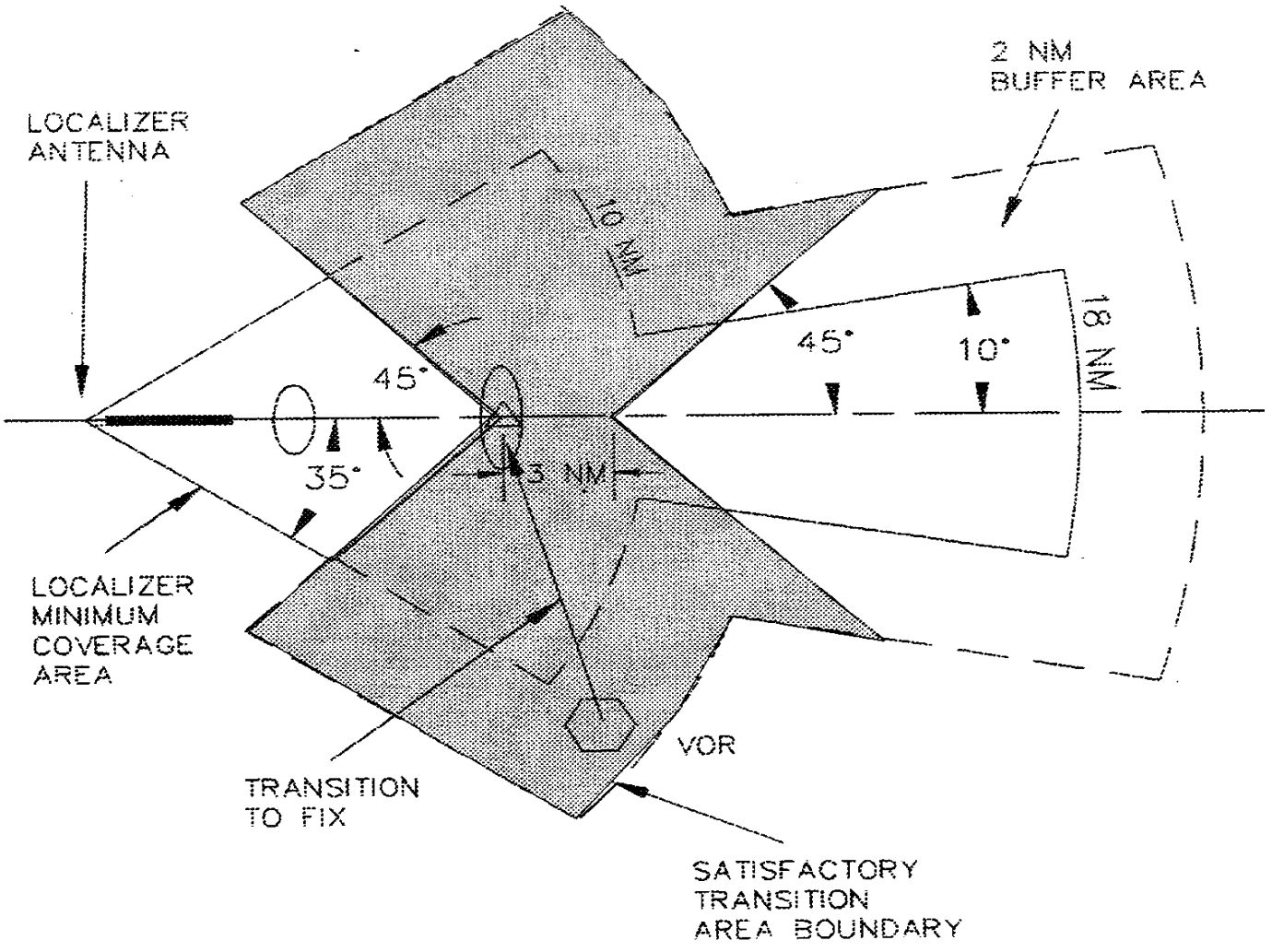


Figure 7-1. TRANSITION TO LOCALIZER FIX FOR PT

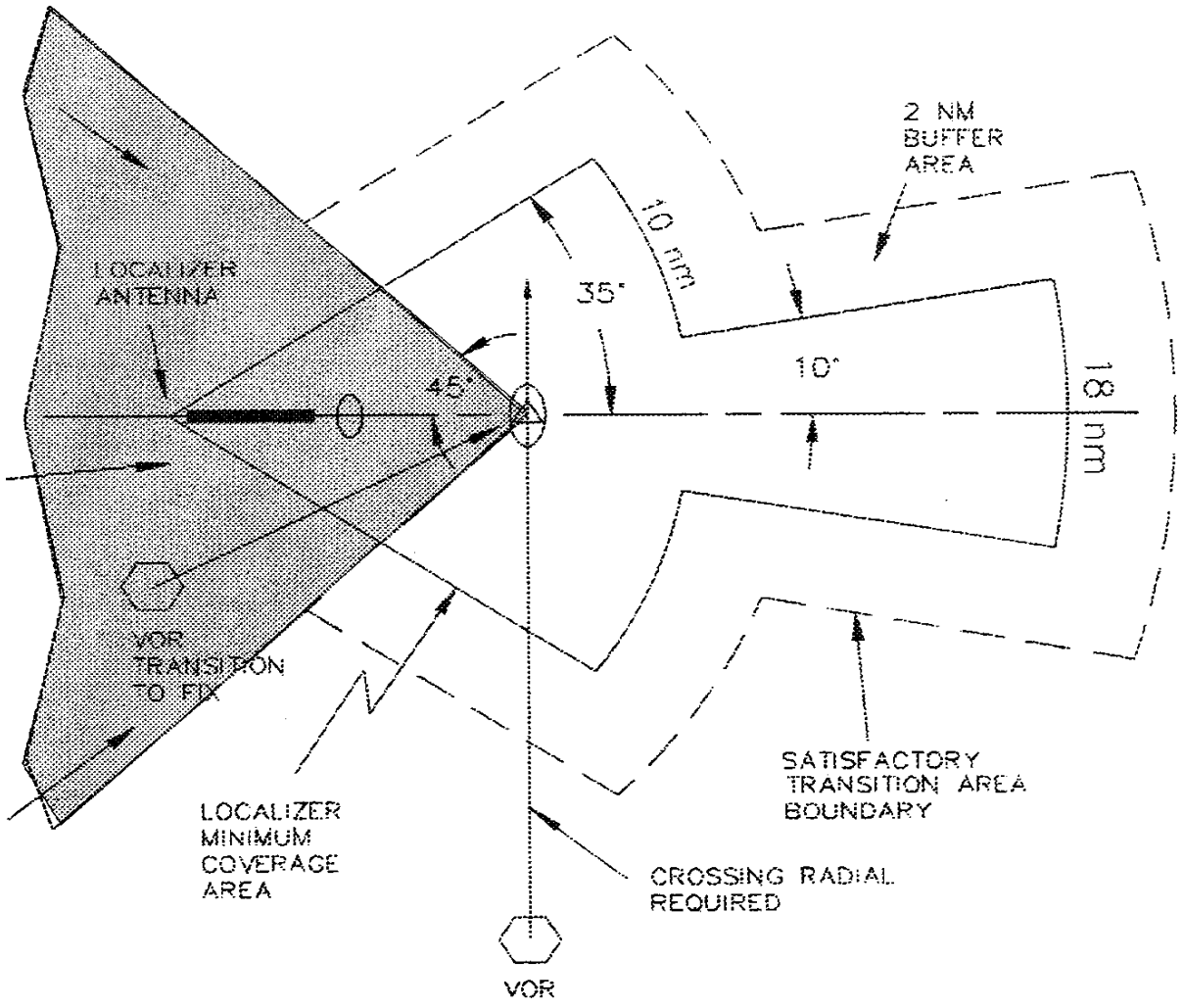


Figure 7-2. TRANSITION TO OM FOR PT

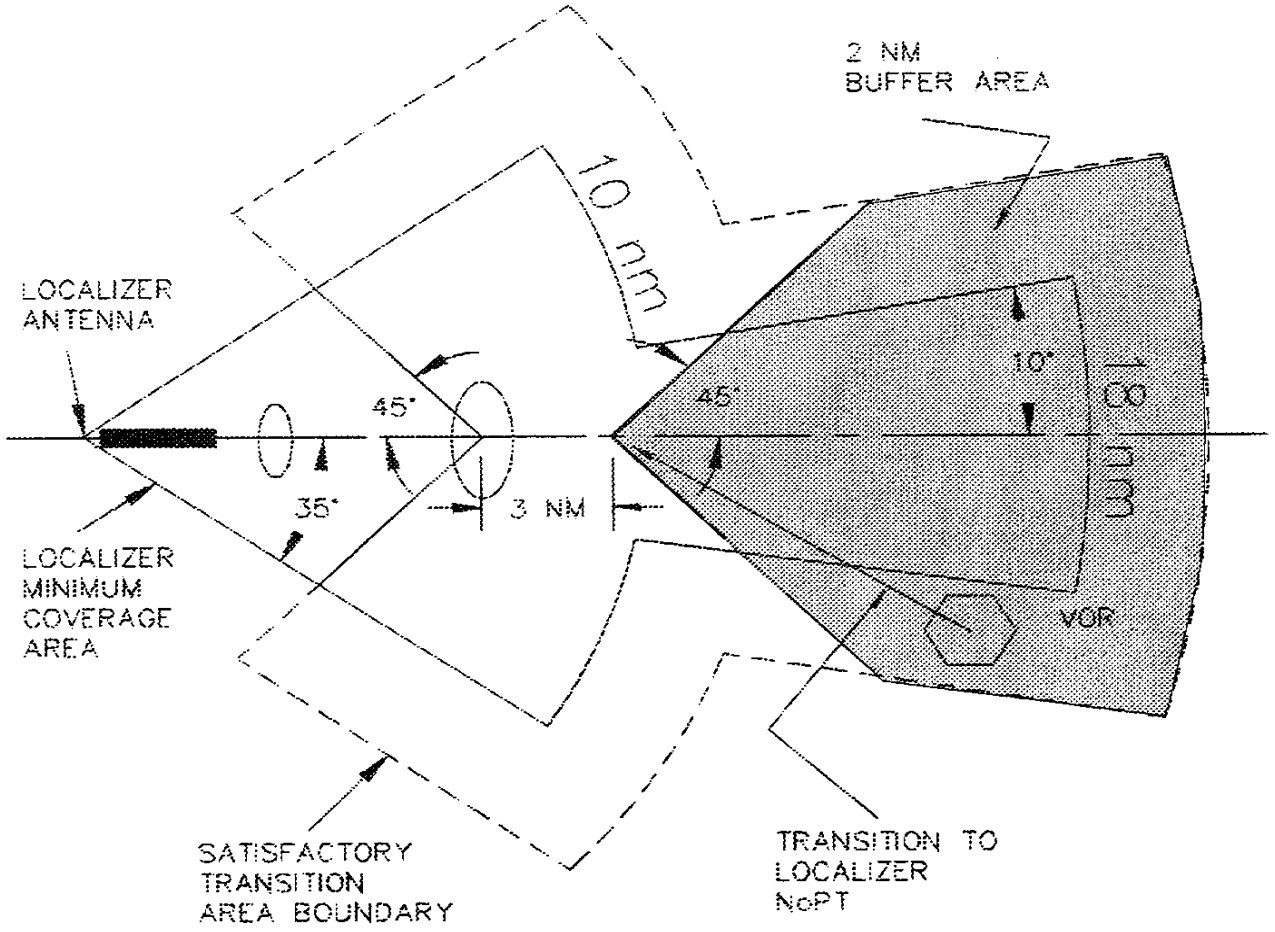


Figure 7-3. TRANSITION TO LOC COURSE (NoPT)

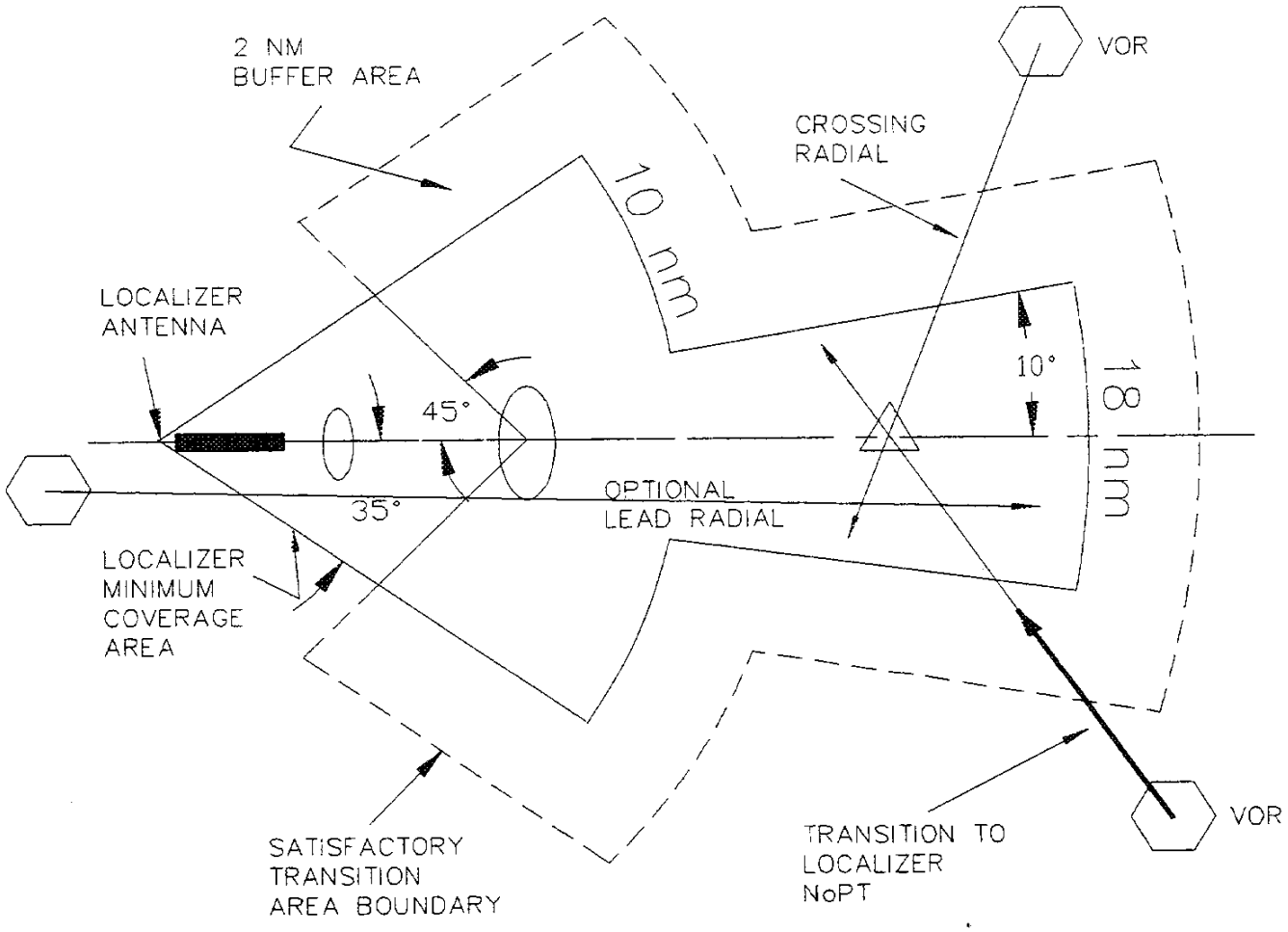


Figure 7-4. STAND-ALONE FIX ON LOC COURSE

SECTION 6. AIRPORT PLANNING

707. GENERAL.

a. Familiarity. Since runway location, configuration, and alignment with respect to associated navigation facilities determine the IFR capability of an airport, AVN-100 regional personnel should be thoroughly familiar with all airports existing or planned in their areas of responsibility. AVN-100 specialists should have access to all available material relative to airport planning and development and be familiar with the AIP projects for which they are responsible. The AWO/PM will participate as an ad hoc team member for airport planning issues at IFR airports desiring improved low weather operations, or where safety issues dictate Flight Standards involvement.

b. Airport Master Plans or amendments coordinated by the Airports Division, should be routed through regional Flight Standards Divisions and AVN-100 regional personnel for review and comment. AVN-100 should develop necessary coordination procedures with Airports Division personnel.

SECTION 7. PRIVATE AID

708. GENERAL.

a. Informal Discussions. Regional Flight Standards and regional AVN-100 personnel will frequently be called upon by municipalities, private interests, or other government agencies for recommendations relative to the location and type of instrument approach facilities most practicable. This type of cooperation is encouraged. However, it should be made clear that informal discussions with sponsors of private facilities (non-Federal) are advisory in nature and do not necessarily represent the FAA's official position nor commit it to a particular course of action. AVN personnel should be familiar with the guidance in Order 6700.20, Non-Federal Navigational Aids and Air Traffic Control Facilities, regarding establishment of non-Federal NAVAID's.

b. Proposal Process. Before private facilities can be installed and operated for private or public IFR procedural use, the proposal must be processed for airspace analysis and frequency allocation study. Also, agreements for the inspection and acceptance must be drawn in accordance with 14 CFR Part 171 or other applicable Administration directives. Requests received for establishment of non-Federal electronic air navigational aid facilities shall be forwarded to the appropriate regional AF division for initial processing. See Order 6700.20, paragraph 13.

c. Sponsor Advice. Occasions will arise where a sponsor will seek advice concerning the use of a new type of navigational facility or a type that is not approved for use by the FAA. In these situations, regional Flight Standards and FPO personnel shall make no commitment with respect to the acceptability, installation, or procedural use of such facilities. Refer inquiries of this nature to the Washington Program Office for information and advice concerning appropriate handling of such matters. Sponsors of private facilities should be advised to direct formal requests or inquiries, relating to the approval and use of private facilities, to the appropriate regional Airways Facilities office for necessary review and processing. Contact Flight Standards, AFS-400, for advice regarding the impact of new/emerging technologies on the facility proposal.

SECTION 8. FACILITIES AND EQUIPMENT (F&E) SUPPORT

709. SUPPORT.

a. At the regional level, the responsibility for identifying improvements to operational minimums or for establishing safety requirements is jointly shared by AVN-100 and the respective regional Flight Standards Division (FSD). Chapter 1, section 2, Responsibilities, of this order specifies primary responsibilities of each organization. Additionally, each organization has unique skills and expertise which, in many situations, can be combined in a teamwork approach in the area of airport and navigational facility planning. AVN-100 personnel serve in a team leadership role for the region in developing and recommending improvements to IFR procedures, operational minimums, and associated facilities.

b. It is expected that a regional AVN/AFS team approach will provide a method for regional Flight Standards input on behalf of system users and operators which addresses operation and safety concerns.

c. The FSD also submits written justification for visual aids (not associated with IFR airports) and provides technical advice for IFR studies or recommendations which may not meet established standards; e.g., require AFS approval for waiver or NCP. Each team should establish a means of submitting its respective organization's input to the regional F & E budget.

710.-799. RESERVED.

CHAPTER 8. INSTRUMENT APPROACH PROCEDURES DATA TRANSMITTAL SYSTEM

SECTION 1. GENERAL

800. GENERAL.

a. *Forms.* FAA Forms in the 8260-series are utilized for the publication of manually developed instrument flight procedures. Instrument Approach Procedures Automation (IAPA) utilizes electronically generated 8260-series equivalent forms for the same purpose. National Ocean Service (NOS) and other charting agencies publish instrument flight charts based on data contained on these forms.

b. *General design requirements.* Instrument approach procedures must provide a smooth transition from the en route structure, and provide the pilot with sufficient information to effect a safe instrument approach to a landing or missed approach. In the interest of safety, these charts must be easy to interpret. The speed of modern aircraft demands that greater simplicity, minimum cockpit workload, and ease of interpretation be incorporated in the design of the instrument procedure. Criteria utilized in the design of standard instrument procedures is contained in FAA Order 8260.3B, United States Standard for Terminal Instrument Procedures (TERPS).

Note: Attempts to apply all possible options permitted by criteria to obtain lowest possible minimums, should not be made if the resultant procedure is overly complex and only a minor operational benefit is gained.

c. *Give full consideration to the environmental impact* of procedures on local communities. Avoid schools, churches, hospitals, stadiums, rest homes, populous residential areas, and other noise sensitive areas whenever possible due to the potential for adverse environmental impact. Where the location of facilities and the flow of air traffic will permit, utilize the highest possible altitudes consistent with optimum descent rates in all segments of approach procedures to provide the least noise interference. See also paragraph 207.

SECTION 2. FORM USE AND PREPARATION

801. USE OF FORMS.

a. *Procedures Published in FAR, Part 97.* SIAPs authorized for public use are published as rules in the Federal Register by reference to FAA standard forms. An index of all SIAP originations, amendments, and cancellations is published in the Federal Register to provide public notice of the rulemaking actions. All requests for new instrument procedure service are approved by the Regional FPB after coordination within the region and prior to development by the FIAO.

b. *Camera-Ready Copies.* Manually developed instrument approach procedures are prepared on the forms listed below as typed, camera-ready copies suitable for reproduction. IAPA-developed instrument approach procedures are prepared on computer generated 8260-series equivalent forms which are camera-ready and suitable for reproduction. After the procedures are developed and approved by the FIAO, they are reviewed by the AVN, and issued as rules by the Technical Programs Division (AFS-420) for the Director, Flight Standards Service (AFS-1).

(1) ILS Standard Instrument Approach Procedure, FAA Form 8260-3 (ILS, MLS and ILS/DME).

(2) RADAR Standard Instrument Approach Procedure, FAA Form 8260-4.

(3) _____ Standard Instrument Approach Procedure, FAA Form 8260-5 (LOC, LOC/DME, LDA, VOR, VOR/DME, VOR/DME or TACAN, NDB, SDF, RNAV, and other nonprecision procedures).

(4) Continuation page of Standard Instrument Approach Procedure, FAA Form 8260-10. Used as a continuation sheet for Instrument Approach Procedure forms listed above and for DF procedures.

(5) IAPA developed forms.

c. *Special Use Procedures.* Special instrument approach procedures are developed for individual operators and are issued to the user through Operations Specifications or Letters of Authorization. They may be predicated on private or public-use navigation facilities and usually contain conditional authorizations that apply to the individual operator(s). The use of the special instrument approach procedure is not encouraged and shall be avoided when an equivalent service can be provided with the use of a public use procedure.

(1) _____ Special Instrument Approach Procedure, FAA Form 8260-7, is **developed** by the FIAO upon request of the FPB and reviewed by AVN.

(2) The **approving authority** for a special instrument approach procedure is the Manager, Flight Standards Division, of the region having jurisdiction over the airport, or his designated representative.

(3) **Coordination, reproduction, and distribution** are accomplished by the regional FPB.

802. FORM PREPARATION.

a. *Preparation.* FAA Form 8260-3 has the title information and appropriate FAR 97 subpart pre-printed. When MLS procedures are documented, delete the term "ILS" and type the desired equipment acronym in its space. FAA Form 8260-4 has the title information and appropriate FAR 97 subpart pre-printed. On FAA Form 8260-5 enter the type of procedure, as listed below, in the space preceding the phrase "Standard Instrument Approach Procedure". For DF procedures on FAA Form 8260-10, enter **"Emergency DF"** and leave FAR subpart **blank**.

b. *Appropriate FAR, Part 97 subparts* for individual types of procedures are:

(1) 97.23 VOR, VOR/DME, VOR or TACAN, and VOR/DME or TACAN.

(2) 97.25 LOC, LOC/DME, LDA, LDA/DME, SDF, and SDF/DME.

(3) 97.27 NDB and NDB/DME.

(4) 97.29 ILS, ILS/DME, MLS, MLS/DME and MLS/RNAV.

(5) 97.31 RADAR.

(6) 97.33 VOR/DME RNAV, LORAN RNAV, GPS RNAV.

(7) 97.35 COPTER (including COPTER LORAN, COPTER GPS, etc.)

c. *Combined Charting.* Some charting agencies combine certain instrument approach procedures on one chart where procedural data are compatible. Where an NDB or compass locator is established at an ILS outer marker site, the individual ILS and NDB procedures should be developed in a manner that will permit combined charting, provided TERPS criteria can be complied with for both procedures. Different types of civil instrument approach procedures shall not be combined on SIAP forms or on NOS approach charts, except for "VOR or TACAN" and "VOR/DME or TACAN" SIAPs predicated on VORTAC facilities. Where Army offices request combined procedures based on different types of facilities, separate but compatible procedures shall be documented on the appropriate forms. Combining of instrument approach procedures on military charts will then be accomplished as a cartographic function of the Defense Mapping Agency.

d. *IAPA Forms.* Guidance for preparation of IAPA generated 8260-series equivalent forms is contained in appropriate sections of the IAPA Users Manual.

803. AIRPORT DATA REQUIREMENTS FOR INITIAL INSTRUMENT APPROACH PROCEDURE SERVICE.

a. *Pre-Request Action.* The regional FPB shall ensure that an airspace analysis of the airport has been accomplished as required by Order 7400.2, Procedures for Handling Airspace Matters, and TERPS paragraph 122a before requesting the FIAO to establish the initial instrument approach procedure to an airport. Instrument approach service shall not be authorized for an airport that is restricted to VFR operations until it is reclassified as an IFR airport by the region. The intent of this paragraph is to establish the minimum data required to construct a procedure after IFR operations are approved. Accordingly, regions should accept less data during the initial approval stage when approval is in question and the submitted layout plan or drawing is adequate for determining IFR status.

b. *Data Requirements.* In order to construct initial instrument approach procedures and publish approach charts in accordance with Inter-Agency Air Cartographic Committee (IACC) specifications, data, in addition to that supplied on the FAA 8260-series forms, are required unless a current OC chart exists for the airport. If a current OC chart is not available, the regional FPB is responsible to see that engineering plans or other accurate airport drawings containing tie points to section corners, bench marks, or other specific geographic or topographic landmarks are provided.

c. *Processing.* FPBs shall forward such plans or drawings to AVN-240 for evaluation and coordination of any changes required, prior to inclusion into the AMIS/IAPA data base and use in procedure construction.

d. *Data Elements.* These plans shall also include the following data elements to the desired accuracy as indicated:

(1) Type runway surface, length, width, station points, true azimuth, and runway end/threshold coordinates to the nearest hundredth of a second.

(2) The elevation of the highest point of an airport's usable runways (airport elevation), and, if straight-in minimums are desired, the highest centerline elevation in the first 3000 feet of the runway beginning at the threshold (touchdown zone elevation) - to the nearest foot above mean sea level; and, the elevation of the runway ends/thresholds - to the nearest tenth of a foot.

(3) Beacon and control tower location by latitude and longitude to the nearest hundredth of a second, and height/elevation to the nearest foot if installed.

(4) NAVAID location by latitude/ longitude to the nearest hundredth of a second; and by relation to the runway in Cartesian (X,Y) coordinates if located on the airport.

(5) Location of helicopter landing area if IFR helicopter operations are involved.

(6) Airport approach and runway lighting using approved terminology to describe the lighting systems; e.g., MALS for Medium Intensity Approach Light System, RCLS for Runway Centerline Light System, etc.

(7) Instrument landing system (ILS) engineering plans indicating the location of the various system components.

e. *The sponsor* of a public use, military, or special instrument approach procedure is expected to provide the necessary airport data to the regional FPB when required. SIAP development shall be delayed until this information has been provided.

804. COURSE AND DISTANCE INFORMATION.

a. *Application.* Magnetic variation shall be applied to terminal routes as follows:

(1) **Facility to Facility:** Variation of the first facility applies.

(2) **Dog leg:** Variation of each facility forming the route applies to its segment.

(3) **Fix to Facility or Facility to Fix:** Variation of the facility applies.

(4) **Dead Reckoning:** Variation of the next facility providing course guidance applies.

b. *Calculations* should be made using the most accurate data available (bearings and distances to two decimal places). Magnetic variation of record, in whole degrees, is then applied. Final results are rounded by NOS to the nearest whole digit.

c. *Rounding.* Where rounding to the "nearest" value is appropriate, and except where otherwise required, round numerical values .01 through .49 DOWN, and .50 through .99 UP. This applies to distances, elevations, altitudes, degrees, etc. For example, 1100.49' becomes 1100', while 1100.50' becomes 1101'. Similarly, 131.49° becomes 131°, while 131.50° becomes 132°.

805. COMMUNICATIONS DATA.

a. *Communications requirements and frequencies* for inclusion on instrument approach procedures charts will be provided by NFDC in accordance with Order 7910.2, "Frequencies Listed on Instrument Approach Procedure Charts."

b. *Where specific local communication requirements exist* for published instrument approach procedures, and where these data are not currently charted, enter one of the following notes under "Additional Flight Data":

(1) **Where approach control service is provided by ARTCC** through a remote site: **"Chart Indianapolis Center frequency."**

(2) **Where approach control service is provided through the controlling FSS** by LRCO or RCO. The controlling FSS will be indicated: **"Chart Indianapolis Radio LRCO (RCO)."**

806. NOS OBSTACLE DATA.

The Airspace and Obstruction section of NOS maintains an obstruction data file. This section compiles and maintains a record of verified obstacles which are 200 feet or more above ground level. It also has information on a number of unverified obstacles which are below this height and is documenting information on certain terrain elevations. NOS will research its files on a time-available basis when a request for obstacle data is received from a FIAO. Direct communications between the FIAO and NOS is authorized for this purpose. Requests for obstacle data within a designated geographical area should identify the area desired by geographical coordinates or by a specified radius from an airport reference point (ARP) or navigation facility. See paragraph 271c.

807. TERMINAL ROUTES GENERAL.

Terminal routes consist of feeder, initial, and intermediate approach segments. They provide aircraft guidance from the en route airway structure to the final approach fix. A minimum number of routes required to satisfactorily transition the aircraft to the terminal environment shall be specified.

a. *Non-Radar Routes.* Since radar vectoring is an approved method of providing procedure entry, the number of non-radar routes shall be limited where radar vectoring is provided on a 24-hour basis. Where practical, at least one non-radar route shall be provided to ensure transition from the en route structure in the event of radar/communications failure. Radar vectoring may be provided through any approach segment up to and including the final approach fix (intermediate fix with ARSR).

b. *Transition.* Instrument approach procedures shall NOT be developed that require **"DME or RADAR"** as the sole means for procedure entry if any other type of transition is available, unless specifically requested by ATC. It is not necessary to designate terminal routes which coincide with segments of the en route structure; however, these routes shall be designated when a lower altitude is authorized or when clarity is essential. With the exception of arc feeder or arc initial approach segments, terminal routes originating on an airway require the establishment of a named fix to identify the starting point of the route. The fix shall be common to the en route structure and instrument approach procedure.

c. *Turn Limitation.* When a procedure turn or holding pattern entry is not authorized, and airways or routes which are not specified as terminal routes lead to the fix where the intermediate segment begins, the procedure must ensure that the angular limitation on turns over the intermediate fix is not exceeded. This is not mandatory when ATC agrees to provide full-time radar vectoring service for these routes.

d. *Charting.* All terminal routes listed in the Terminal Routes section of the 8260 series forms will be charted or identified in the plan view of the instrument approach chart. Where a procedure turn or holding pattern entry is not authorized, the procedure shall identify the point where the profile begins.

e. *Feeder Routes.* Where feeder routes are required to transition from the en route structure they will terminate at an initial approach fix or at the facility from which a procedure turn or holding pattern entry is authorized. En route obstacle clearance criteria apply to feeder routes.

f. *Multiple DME Sources.* When an ILS (or LOC or LDA) facility has collocated DME, it is necessary to reduce the potential for confusion with other DME sources in the terminal area. Failure to tune to the ILS DME when inbound can result in incorrect fix indications. Apply the following guidance:

(1) **Delete** the requirement to use two DME facilities on ILS or LOC/LDA procedures wherever possible.

(2) **Delete DME arcs to LOC/LDA courses** at locations where radar vectoring is possible. In some locations, this may require a Note: **"Radar Required."** Where radar is not available, delete DME arcs where an alternate means of procedure entry is available.

(3) **DME frequencies are paired** with the frequencies of the VOR, localizer, or MLS. When a **non-paired** DME is used in a VOR/DME, ILS/DME, etc., procedure, **simultaneous reception** of both facilities must be assured. This requires a standard Note indicating the DME location and the identification of both facilities: **"DME from XYZ VORTAC. Simultaneous reception of I-ABC and XYZ DME required."** DME frequencies are not paired with NDBs; and, DME antennas may or may not be collocated with the NDB. For NDB/DME SIAPs, use standard Note: **"Simultaneous reception of ABC NDB and XYZ DME required."**

(4) **On procedures using two DME facilities,** one of which is associated with a LOC or LDA, and both of which are forward of an aircraft on the LOC/LDA course, the following **profile Note** is required: **"Use I-XXX DME when on the LOC/LDA course."** This applies to front and back course procedures regardless of glide slope availability. In Additional Flight Data, indicate that the note is to be charted in profile.

(5) Similar precautions may be necessary for **MLS.** Evaluate each situation and take the appropriate action.

g. *Initial Approach Segments.*

(1) Initial Approach Segments not requiring a course reversal. Evaluate the flow of air traffic to determine the need for routes which do not require a course reversal. Where a course reversal exists on a SIAP, each initial approach segment for which a course reversal is *not required* shall include a designation of **"NoPT"**. If a course reversal is *not authorized* for any of the terminal routes, the NoPT designation is not appropriate; indicate instead that a procedure turn is not authorized. See paragraph 811a(3).

(2) Specify an arrival sector from which course reversal shall not be made when NoPT designations will result in an excessive number of terminal routes as follows:

"NoPT for arrival on ABC VORTAC airway radials 302 CW 096."

(3) Initial Approach segments based on straight courses. All initial approach segments that meet criteria for angle of intercept between the initial and intermediate segments (TERPS paragraphs 232a(1) and (2)) shall join the intermediate segment at a common intermediate fix where possible.

(4) Arc Initial Approach Segment. Requirements for arc initial approach segments shall be fully evaluated to determine if this type of procedure entry is essential to the local traffic flow. Experience indicates that arc initial segments have been established at locations where they are utilized on a very limited basis or have not been fully accepted by the user. Utilization of long arcs or the use of multiple arcs has contributed to undesirable chart clutter with minimum operational advantage.

(a) An arc initial segment in a **radar environment** shall not be authorized unless it is operationally required.

(b) When a DME arc segment of an approach lies along an arc which traverses an area of **unusable radial information,** the provisions of OA P8200.1, paragraph 214.3 apply.

(c) Arc initial segments should be authorized via the **shortest routing** when flight time can be reduced.

(d) Arc initial segments shall be designated by **CW** for clockwise and **CCW** for counter-clockwise.

(e) Arc initial segments shall be designed to satisfy requirements for executing the instrument approach. They shall NOT be established for the **convenience** of routing aircraft around a terminal area.

(f) Arc initial segments less than 3 miles in length are not recommended. Use of aircraft heading to intercept the intermediate course should be considered as an alternate action in lieu of short arc segments.

(g) DME Arc courses shall be predicated only on **collocated facilities** providing azimuth and DME information. Arc initial segments shall not be authorized on DME collocated with ILS or localizer facilities due to the lack of constant azimuth information. See Order 6050.32, appendix III, section 2 for collocation parameters.

h. *Lead Radials.* In addition to the angle of interception requirements of TERPS paragraph 232a(1), a 2 mile lead radial (1 mile for Copter procedures) shall be published with arc initial approaches when the DME is not collocated with the facility providing the procedural course guidance. The lead radial provides information for aircraft with single receiving equipment to change the receiver to the localizer or other facility providing the course guidance and to ensure the aircraft is within the clearance coverage area of LOC facilities before changing frequency or accepting on-course indication.

i. *Identification of Initial Approach Fix (IAF).* Because of military requirements, IAFs shall be identified on civil public-use procedures.

j. *Intermediate Segments.*

(1) When a procedure turn or holding pattern entry is authorized at the FAF and a straight-in intermediate segment (without initial) is also authorized, data on the intermediate segment shall be included in the Terminal Routes

block. In this situation, **(NoPT)** shall be added to the intermediate segment.

(2) When the course reversal fix is outside the FAF, the segment(s) from the course reversal fix to the FAF shall be included in Terminal Routes, unless both fixes are marked by DME from the same source or LOC minimums are not authorized.

(3) When a procedure turn or holding pattern is not authorized, the intermediate segment shall be included in the profile view of the instrument approach chart and entries pertaining to these segments shall be included in the Terminal Routes section, and on line 4 of the form 8260. The only exception will be when radar vectoring is required to the FAF.

808. TERMINAL FIXES.

Named terminal fixes shall be documented on FAA Form 8260-2. Named facilities do not require this documentation unless holding is established. See also paragraph 264.

a. *Restriction.* The following fixes should NOT be named unless naming is required for control of aircraft, such as when used as a clearance limit, for holding, or for procedural clarity:

(1) DME only fixes.

(2) Starting and ending points of arc initial or feeder segments.

(3) Points where feeder or initial routes intercept the final approach course extended prior to the initial or intermediate fix. A dog-leg route description is preferable.

b. *Audit Trail.* List terminal procedures using a fix in the "Remarks" section of the 8260-2. This helps ensure that affected procedures are not overlooked when the fix is modified. If the list would be too large, show only types of procedures and airports served. Maintain the "Chart Publication" section of the 8260-2 in current status to ensure correct charting of the fix.

c. *DME References.* When designating fixes on Form 8260-3, -4, -5 and -7, include DME references to the hundredth of a nautical mile when DME is appropriate and available. Provide the fix name and DME distance as follows:

(1) DME fix, with course and DME from the **same facility:**

JOANI/7.00 DME

(2) DME fix, with **DME not collocated** with course facility, identify fix and facility providing DME:

JOANI/ABC 7.00 DME

(3) Intersection fix, with DME available from **more than one facility** forming the fix, identify the intersection and the facility providing the required DME information:

JOANI INT/ABC 7.00 DME

(4) **Unnamed DME fixes** shall be described clearly: Specify NDB bearings "FROM" the facility.

ABC R-259/4.00
ABC VORTAC R-259/4.00 (Enter "VORTAC" if required for clarity.)
DEF 072/23.00 (Facility is DEF NDB/DME)
6.51 DME (Exclude the DME identification when there is no doubt that course guidance and DME are from the same facility)

d. *A full description of a fix,* when it first occurs on the form, satisfies charting requirements. For example, entering "ARNET LOM/INT/ABC 8.53 DME" or, "NIXON INT" once in the Terminal Routes section, and thereafter entering **"ARNET"** or **"NIXON"** where ever else it occurs on the form ensures that the fix will be charted correctly on both the plan view and the profile sections of the approach chart. When included in the missed approach instructions, use a full description of a fix appropriate to its use in the missed approach procedure. Example: (Fix name: MORIS LOM/INT/7 DME) **"CLIMB TO 3600 DIRECT MORIS LOM AND HOLD."** Example: (Fix name: DAVEE INT/16 DME) **"CLIMB TO 3600, THEN CLIMBING RIGHT TURN TO 4000 VIA ABC VORTAC R-180 TO DAVEE INT/16 DME AND HOLD."**

e. *When no fix overlies an LOM,* the identifier may be used: **AB LOM**. Use the identifier on NDB procedures. In all other cases, when a named fix is at the LOM, use that name: **ABBAH LOM**. Use the named fix on LOC and ILS procedures.

f. *An alternate method of identifying an LOM,* such as an **INT** or **DME**, is often helpful in ILS or LOC SIAPs, but an INT is not appropriate in NDB SIAPs.

g. *Design SIAPs, utilizing crossing courses for fix identification* along the inbound course, to minimize cockpit tuning requirements as prescribed in TERPS paragraph 288c.

SECTION 3. COMPLETION OF FAA FORMS 8260-3/5

809. GENERAL.

This section contains information applicable to the completion of FAA Forms 8260-3 and 8260-5. Certain information contained herein is also applicable to Forms 8260-4, 8260-7, and 8260-10 which is covered in the succeeding section. Guidance is referenced to each separate area of the forms.

810. TERMINAL ROUTES.

The information described in the Terminal Route section along with data entered on line 1 or 2 is used to develop the plan view of the instrument approach chart.

a. *From-To columns.* Routes shall be listed from fix to fix. Terminal routes that do not provide a NoPT capability should be established direct to the fix or facility from which the course reversal is authorized. Enter the name of the fix to which an arc segment connects in the "TO" column. If there is no named fix, enter the appropriate fix description in accordance with paragraph 808c.

(1) **IAF** designations shall be entered in the "FROM" column after each initial approach fix. Describe RNAV ATD fixes with respect to the next waypoint: **5.00 ATD from NIXON WP.**

(2) **NoPT** shall be entered in the "TO" column for initial segments that permit elimination of the procedure turn. The intermediate segment shall only be designated NoPT if necessary to clarify the procedure. A segment after a course reversal fix shall not be designated NoPT.

(3) **CW** for clockwise or **CCW** for counter-clockwise shall be entered in the "FROM" column for arc segments.

(4) **Feeder or initial routes based on dog-leg segments,** where there is no altitude change between segments, shall be entered on one line and described fix to fix. For a dog-leg to a DME fix on a localizer course, enter only the DME fix; e.g., **IAG 10.00 DME.** The localizer course is specified in the course/distance column. See paragraph 810b(3) below.

(5) If an **altitude change** occurs where a feeder or initial joins the next segment, specify each segment on separate lines. A combined initial/intermediate segment entry is authorized only when there is **no altitude change** between the segments.

(6) **Multiple initial segments** which connect at a common IF require separate line entries for each initial segment, and a single entry for the intermediate segment, irrespective of the segment altitudes.

b. *Course/Distance column.* Specify the course and distance for each route segment. Enter the actual magnetic course to the hundredth of a degree, and distance to the hundredth of a mile. NOS will round for publication.

(1) Where **course guidance is apparent** (fix to facility, facility to a fix, or facility to facility): **090.17/10.03.**

(2) Where **course guidance must be specified** (fix to fix): Specify NDB bearings "FROM" the facility.

090.44/7.12 (I-ABC).
090.11/8.20 (ABC R-270).
090.34/10.56 (XXX Brg 090).
251.33/7.89 (M-AVE).

(3) Where there is a **single route defined from fix to fix via two segments** (dogleg), and there is no altitude change between segments, the course, distance and guidance shall be identified for each segment in one single entry.

130.49/7.10 (ABC R-130) & 185.01/4.33 (XYZ R-185).
005.21/3.60 (Hdg) & 296.36/4.82 (I-MSP).
130.28/4.12 (Hdg) & 180.18/7.45 (ABC R-360).

(4) **Enter** the DME arc utilized in an arc segment: **14.00 DME Arc.**

(5) When a **Lead Radial or Bearing** is required, enter the data in parentheses immediately below the course and distance data in the following manner: **(ABC LR-300)**; **(ABC LBRG-300)**.

c. *ALT Column.* Enter the altitude authorized for the route. When the routing requires a course reversal, the altitude authorized shall not be lower than the procedure turn altitude. The altitude authorized for any terminal route shall be no lower than the altitude authorized for succeeding segments. Where more than one segment joins at a common fix, a common altitude should be selected whenever possible. Optimum descent gradients shall be used where feasible for noise considerations and as a means to conserve airspace.

811. LINES 1 THROUGH 8.

a. *Line 1.*

(1) **Enter procedure turn side** of course as left or right of the outbound course; i.e., the large side of the template. Enter the outbound course to the hundredths of a degree, procedure turn altitude, procedure turn distance and name of fix from which the procedure turn is authorized as follows:

PT L side of CRS 018.13 outbound, 2300 ft. within 10 mi. of MELIS INT (IAF).

(2) **Delete all pre-printed information** on line 1, when a teardrop course reversal is specified, and enter the data in accordance with the following examples:

Collocated facility:
Teardrop R-160 outbnd, R-355 inbound, 4300 ft. within 15 mi. of ABC VORTAC (IAF).

Non-collocated facility:
Teardrop R-160 (ABC VORTAC)(IAF) outbound to NIXON/19.00 DME, 355.00 (I-XYZ) inbound, 3000 ft. to KENNEDY OM/INT.

(3) Enter "**NA**" following "PT" when a procedure turn is not authorized.

b. *Line 2.*

(1) For purposes of **standardization,** instrument approach procedures should authorize a standard PT where a **course reversal** is required. TERPS paragraph 234e establishes conditions for utilizing a **holding pattern** in lieu of a PT; however, the requirements of paragraphs 234e(1) and (2), and paragraph 292 must be met. When a holding pattern is authorized, establish the direction of holding based on the **inbound course** as shown in figure 8-1. Enter holding data on line 2 in accordance with the following example:

Hold SE OMEGA LOM, RT, 313.09 inbound, 1600 ft. in lieu of PT (IAF).

Magnetic Course (Inbound)	Holding Pattern Direction (based on inbound course)
338-022	S
023-067	SW
068-112	W
113-157	NW
158-202	N
203-247	NE
248-292	E
293-337	SE

Figure 8-1. Holding Pattern Directions

(2) On **procedures that do not authorize a PT or holding pattern,** enter the fix/facility from which the profile is to start. The profile shall include the intermediate fix and may be extended to include all fixes established on the final approach course extended for clarity. (The exception is when radar vectoring is required to the FAF.)

Profile starts at STING.

(3) When an **obstacle in the PT entry zone** precludes early descent to PT altitude, place an attention symbol after the PT fix on line 1 and enter the restrictive note on line 2. (IAPA places this note in "Profile Notes" on the IAPA equivalent form 8260-3/5.)

***Maintain 12000 or above until established outbound for PT.**