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This instruction implements AF Policy Directive 11-2, *Aircrew Operations*. It provides guidance on developing, approving, revising, publishing and deleting instrument approach and departure procedures and applies to all U.S. Air Force (AF), Air National Guard (ANG), and Air Force Reserve Command (AFRC) Terminal Instrument Procedures (TERPS) functions. It applies to flying activities at all AF, ANG, and AFRC airfields where the AF, ANG, AFRC or an AF component of a unified command conducts or supports instrument flight. Use this instruction in conjunction with FAA Order 8260.3, *U.S. Standard for Terminal Instrument Procedures (TERPS)*, and Allied Air Traffic Control Publication (AATCP)-1, *North Atlantic Treaty Organization (NATO) Supplement to International Civil Aviation Organization (ICAO) Doc 8168-OPS/611 Volume II for the Preparation of Instrument Approach and Departure Procedures.* When there is a conflict between guidance in this AFI and any of the other documents listed in this AFI as reference, use the guidance in this AFI. Forward copies of all supplements for this instruction to the Office of Primary Responsibility (OPR) for review and coordination before publishing. Refer recommended changes and questions about this

publication to the OPR using the AF Form 847, *Recommendation for Change of Publication*; route AF Form 847s from the field through the appropriate functional's chain of command. AFI 11-215, *USAF Flight Manuals Program (FMP)*, governs processing of AF Form 847. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located at **https://www.my.af.mil/afrims/afrims/afrims/rims.cfm**. The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force.

**(AFSPC)** This supplement implements and extends the guidance of Air Force Instruction (AFI) 11-230, *Instrument Procedures*. This supplement describes Air Force Space Command (AFSPC) procedures for use in conjunction with the AFI 11-230 to flying activities at all AFSPC airfields where AFSPC conducts or supports instrument flight. It also applies when AFSPC has development, management, and maintenance responsibility for Terminal Instrument Procedures (TERPS). This supplement does not apply to Air National Guard (ANG) or Air Force Reserve Command (AFRC). The authorities to waive wing/unit level requirements in this publication are identified with a Tier number following the compliance statement. See AFI 33-360, *Publications and Forms Management*, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the Publication OPR for non-tiered compliance items. This publication may not be supplemented or further implemented/extended. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF IMT 847, *Recommendation for Change of Publication*; through channels, to HQ AFSPC/A3SR, 150 Vandenberg St. Suite 1105, Peterson AFB, CO 80914-4200. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS). The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force.

## *SUMMARY OF CHANGES*

This document has been substantially revised and must be completely reviewed. Major changes include dividing the AFI into parts, chapters and sections and updating the AFI to comply with new requirements in AFI 33-360, *Publications and Forms Management*.

## Part 1

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# Chapter 1

## INTRODUCTION TO USAF TERMINAL INSTRUMENT PROCEDURES (TERPS)

### *Section 1A—Roles and Responsibilities*

**1.1. HQ United States Air Force (HQ AF/A3O-B).**

1.1.1. Delegates the authority for approving criteria in FAA Order 8260.3, *United States Standard for Terminal Instrument Procedures (TERPS)*; NATO AATCP-1, *North Atlantic Treaty Organization (NATO) Supplement to ICAO Doc 8168-OPS/611 Volume II for the Preparation of Instrument Approach and Departure Procedures*; International Civil Aviation Organization (ICAO) Procedures for Air Navigation Services - Aircraft Operations (PANS-OPS); and this instruction to HQ AFFSA.

1.1.2. Delegates the authority for approving standard and nonstandard instrument flight procedures (IFPs) to the respective major command (MAJCOM), National Guard Bureau (NGB), and Air Force Component of a Unified Command Director of Operations (A3).

**1.2. HQ Air Force Flight Standards Agency (HQ AFFSA/A3A).**

1.2.1. Manages the USAF Terminal Instrument Procedures Program in support of AF IFP requirements. Provides direction and information as needed through the issuance of administrative changes (ACs), interim changes (ICs), or via a complete rewrite of this instruction. **Note:** HQ AFFSA/A3A reviews and approves MAJCOM supplements to this instruction.

1.2.2. Maintains liaison, effects coordination, and serves on committees with other agencies within the US Government, industry, and international civil or military organizations on matters relating to instrument procedure criteria. Represents AF and Department of Defense (DOD) interests, as directed.

1.2.3. Manages the USAF Foreign Terminal Instrument Procedure (FTIP) Acceptance Program.

1.2.4. Informs the National Geospatial-Intelligence Agency (NGA) which AF elements may send IFPs for publication or revision.

1.2.5. Develops and maintains agreements with NGA outlining AF requirements and the data required for publication and maintenance of AF developed IFPs and AF approved FTIP.

1.2.6. Develops and maintains agreements with the Aeronautical Navigation Products office (AJV-3) of the Federal Aviation Administration (FAA) outlining the processing of AF IFP requirements at US civil and joint-use bases.

1.2.7. Identifies and justifies deviations to US charting specifications to NGA. Drafts and submits appropriate Recommendation Document(s) to the Aeronautical Charting Forum (ACF).

1.2.8. Evaluates and approves computer programs used to develop IFPs and Air Traffic Control (ATC) charts.

1.2.9. Develops and maintains the Airfield Operations TERPS inspection checklist located on the HQ AFFSA Airfield Operations website at **https://cs1.eis.af.mil/sites/AFFSA/A3A/SitePages/Home.aspx**.

1.2.10. Monitors the HQ AFFSA TERPS Helpdesk (paragraph 2.16).

1.2.11. Posts applicable deliverables to the HQ AFFSA Airfield Operations website at **https://cs1.eis.af.mil/sites/AFFSA/A3A/SitePages/Home.aspx**.

**1.3. MAJCOM or Air Force Component of a Unified Command, Director of Operations (A3).**

1.3.1. Waiver authority for nonstandard IFPs developed or reviewed by the TERPS function (unit or MAJCOM) under his/her direction. Unless restricted IAW FAA Order 8260.3, paragraph 141, approved waivers apply to all DOD and civil aircraft using the nonstandard procedure. Unless stated otherwise on the FLIP, the A3 (or equivalent) assumes all responsibility for the publication and use of the nonstandard instrument procedure for all users.

1.3.1.1. **(Added-AFSPC)** HQ AFSPC/A3 is the designated waiver authority for all nonstandard Instrument Flight Procedures (IFPs), Air Traffic Control (ATC) charts, and Diverse Vector Areas (DVAs) developed by HQ AFSPC/A3SR. Approved waivers apply to all DOD and civil aircraft, and HQ AFSPC/A3 assumes responsibility for the publication and use of the nonstandard procedures for all users.

1.3.2. Delegates approval authority for standard, unit or MAJCOM developed IFPs, ATC charts, and DVAs to the MAJCOM TERPS function under his/her direction.

1.3.3. Designated waiver authority (paragraph 3.19.4) of the SECDEF policy for FTIP review (Figure 3.1).

1.3.4. Authorizes the use of special use IFPs by AF units and other DOD components not specifically noted IAW paragraph 2.11.1 on the IFP.

1.3.5. Approves night operations when the 20:1 Obstacle Identification Surface (OIS) is penetrated *by unlit obstacles* and a visual glide slope indicator (VGSI) is not installed or is not operational.

**1.4. Major Command (MAJCOM) TERPS Function.** References to MAJCOM throughout this AFI include the Air National Guard TERPS function of the National Guard Bureau and the TERPS function of an Air Force Component of a Unified Command. MAJCOMs are responsible for ensuring unit level compliance with all standards required in this AFI. MAJCOMs that have assumed their supported unit TERPS function shall meet all unit TERPS function responsibilities (paragraph 1.5) except as outlined in an approved MAJCOM supplement to this AFI.

1.4.1. Create and maintain a MAJCOM supplement to this AFI IAW AFI 33-360, *Publications and Forms Management*, when more restrictive or organization-specific guidance is warranted.

1.4.2. Review and approve standard IFPs and ATC charts for locations within their TERPS AOR to include, as applicable, each supported unit's Master Obstruction Chart (MOC) and DVA.

1.4.3. Establish and conduct a quality control program that ensures standardization and validates the accuracy, adequacy, safety, and practicality of each instrument procedure developed and published by the AF within the MAJCOM TERPS AOR. Provide technical and procedural development assistance when requested by supported units.

1.4.4. Coordinate with another MAJCOM for MAJCOM review (as defined in Attachment 1) when situations occur where the only qualified person available to complete the MAJCOM review is the person who developed the procedure. **Note:** When performing the MAJCOM review, the reviewing agency shall consider the current MAJCOM supplement to this instruction.

1.4.4.1. **(Added-AFSPC)** In the absence of a Quality Control (QC) expert/TERPS specialist, HQ AFSPC must enter an inter-MAJCOM agreement to establish a temporary QC function.

1.4.5. Perform site visits to the unit when the MAJCOM has assumed the supported unit's TERPS function. These visits should be made at least annually in conjunction with an Airfield Operations Board (AOB), a MAJCOM Inspector General Inspection, or more often as determined by the MAJCOM.

1.4.6. Implement processes for review of FTIP IAW Chapter 3 of this AFI, as applicable.

1.4.7. Perform host nation accreditation (when applicable), IAW Chapter 3 of this instruction.

1.4.8. Comply with FAA Order 8260.32, *U.S. Air Force Terminal Instrument Procedures Service*, as applicable. Document exceptions to requirements outlined in FAA Order 8260.32 in a Memorandum of Agreement (MOA) between the FAA and the applicable MAJCOM.

1.4.9. Install and use the most current version of GPD software within 45 days of the date HQ AFFSA/A4/5/8 makes it available. When installation will take more than 45 days to complete, notify HQ AFFSA/A3A. **Note:** HQ AFFSA/A4/5/8 will provide the MAJCOM TERPS function advanced notification of new GPD version releases.

1.4.10. **(Added-AFSPC)** HQ AFSPC/A3SR TERPS will develop and maintain electronic continuity files containing the following information at a minimum:

1.4.10.1. **(Added-AFSPC)** TABLE OF CONTENTS

1.4.10.2. **(Added-AFSPC)** AFSPC TERPS POLICIES AND APPT LETTER

1.4.10.3. **(Added-AFSPC)** KEY PERSONNEL

1.4.10.4. **(Added-AFSPC)** REFERENCES

1.4.10.5. **(Added-AFSPC)** PROJECTS IN PROGRESS

1.4.10.6. **(Added-AFSPC)** FLIGHT INFORMATION PUBLICATION (FLIP)

1.4.10.7. **(Added-AFSPC)** NOTICE TO AIRMEN (NOTAM)

1.4.10.8. **(Added-AFSPC)** DIGITAL AERONAUTICAL FLIGHT INFORMATION FILE (DAFIF), DIGITAL VERTICAL OBSTRUCTION FILE (DVOF), and DIGITAL TERRAIN ELEVATION DATA (DTED)

1.4.10.9. **(Added-AFSPC)** TERMINAL AMENDMENT SYSTEM (TAS)

1.4.10.10. **(Added-AFSPC)** .OBS FILE INSTRUCTIONS

1.4.10.11. **(Added-AFSPC)** NFDD CONTINUITY

1.4.10.12. **(Added-AFSPC)** GPD UPDATES

1.4.10.13. **(Added-AFSPC)** GPD AUTO EVALUATIONS

1.4.10.14. **(Added-AFSPC)** NAVAID DECOMMISSIONING REQUESTS

1.4.10.15. **(Added-AFSPC)** TRAINING

1.4.10.16. **(Added-AFSPC)** ADMINISTRATIVE TOOLS

1.4.10.17. **(Added-AFSPC)** TRAVEL AND CONFERENCES

1.4.10.18. **(Added-AFSPC)** ARCHIVE

1.4.11. **(Added-AFSPC)** Standard AFSPC GPD workspace and procedure naming convention:

1.4.11.1. **(Added-AFSPC)** Designate each airfield workspace in GPD as ICAO_AIRFIELD NAME_AIRSPACE EXTENT. (ex. BGTL_THULE AB_105NM)

1.4.11.2. **(Added-AFSPC)** Within each workspace in GPD, designate the procedures as ICAO_PROCEDURE NAME_CRITERIA USED. (ex. BGTL_ILS OR LOC/DME RWY 08T_USAF)

**1.5. Base/Unit Level TERPS Function Responsibilities.**

1.5.1. Initiate actions essential to the fulfillment of TERPS program objectives assigned by the local Operations Group Commander (OG/CC) (or equivalent) or the applicable MAJCOM TERPS function. The OG/CC responsibility is limited to establishing IFP requirements to include the type of IFP(s); how many; high, low, or both; to which runways; etc., when instrument procedure development and maintenance responsibility has been assumed at the supporting MAJCOM.

1.5.1.1. **(Added-AFSPC)** AFSPC TERPS has assumed all unit level TERPS responsibilities except liaison duties.

1.5.1.2. **(Added-AFSPC)** The AOF/CC or DET/CC (as appropriate) is appointed as liaison for HQ AFSPC/A3SR TERPS and responsible for the duties prescribed in the sub-paragraphs listed below. The AOF/CC or DET/CC may delegate the duties of the TERPS liaison to a suitable individual. Document this delegation as an additional duty in an appointment letter. Forward the appointment letter to HQ AFSPC/A3SR.

1.5.1.2.1. **(Added-AFSPC)** Assist HQ AFSPC/A3SR TERPS to coordinate new and revised procedures with appropriate agencies.

1.5.1.2.2. **(Added-AFSPC)** Assist HQ AFSPC/A3SR TERPS in obtaining data from base agencies when required for TERPS development.

1.5.1.2.3. **(Added-AFSPC)** Coordinate any proposed construction or temporary construction waivers with HQ AFSPC/A3SR TERPS at least 45 days prior to the construction start date. At a minimum, provide the type of construction, WGS 84 coordinates for the location, obstacle height in both Mean Sea Level (MSL) and

Above Ground Level (AGL) and vertical/horizontal accuracies of the provided information.

1.5.1.2.4. **(Added-AFSPC)** Obtain OG/CC or Senior Operational Commander signature on AF IMT 4342, *Approach/Departure Signature Page*, as required.

1.5.1.2.5. **(Added-AFSPC)** Coordinate with the servicing Federal Aviation Administration (FAA) Approach Control and ARTCC, as applicable. Signature is required from the respective FAA Agency Representative on the AF IMT 4342, *Approach/Departure Signature Page.* FAA Coordination will be briefed at the Airfield Operations Board and documented in the official minutes.

1.5.1.2.6. **(Added-AFSPC)** Coordinate and obtain required signatures from CE Representative on AF IMT 813, *Request for Environmental Impact Analysis* and AF IMT 4342, *Approach/Departure Signature Page.*

1.5.1.2.7. **(Added-AFSPC)** Coordinate with airfield users to ensure all instrument procedures at the airport are meeting mission requirements. Validate the need for each current published procedure annually and document results in Airfield Operations Board official minutes of the third quarter AOB each year.

1.5.2. Establish a MOC (paragraph 2.19).

1.5.3. Develop, process, and maintain IFPs, DVAs, and ATC charts. Prepare and maintain procedure packages for each using the most current version of GPD software or manual methods, as applicable, to support local flight operations. Coordinate with all required signatory agencies.

1.5.4. Develop MSAW, LAAS, and Programmable Indicator Data Processor submissions as required by location in coordination with the Facility Chief Controller (CCTLR).

1.5.4.1. When requested by the CCTLR, support non-radar board development per AFI 13-204 and AFMAN 13-215, Volume 2, *Airfield Operations Charts and Instrument Procedures Support*.

1.5.4.2. Provide required data and assistance to support development of products such as AN/GPA-134 and Digital Bright Radar Indicator Tower Equipment (DBRITE) digital maps, and Microprocessor Enroute Automated Radar Tracking System (MEARTS) or Standard Terminal Automation Replacement System (STARS) maps.

1.5.5. Provide required data and assistance to support the NCOIC, Airfield Automation Manager (NAAM) develop adaptation, mapping, and MSAW.

1.5.6. Report changes to NAVAID/RADAR data IAW FAA Order JO 7900.2 and this instruction (paragraph 1.14.4).

1.5.7. Prepare Expanded Service Volume (ESV) requests, as required (paragraph 1.10).

1.5.8. Perform review of Flight Information Publications and other TERPS related data (paragraph 2.13).

1.5.9. Maintain current aeronautical source data sufficient to meet IFP design responsibilities. When applicable, include all hard copy (paper) maps required for any

manually developed IFPs or IFP segments. Hard copy maps shall be updated with current Chart Updating Manual (CHUM) data and meet the scale requirements in Table 4.1.

1.5.10. Review the National Flight Data Digest (NFDD), as required (paragraph 1.9.5).

**1.6. MAJCOM TERPS Areas of Responsibility.** The TERPS function from the MAJCOMs indicated are responsible for all AF IFPs in the areas defined in the following sub-paragraphs. Where practical, these areas of responsibility have been aligned with the volume structure of the DOD FLIP (Terminal) publications.

1.6.1. Pacific Air Forces (PACAF) is responsible for instrument and radar procedure requirements in the geographical area covered by the U.S. Terminal Procedures Alaska (ALASKA TERMINAL) FLIP; the High and Low Altitude Pacific, Australasia, and Antarctica (PAC., AUST. & ANT.) FLIP and the High and Low Altitude Eastern Europe and Asia (EEA) FLIP (East of E 88° longitude). The PACAF TERPS AOR also includes India, Pakistan, Nepal and Afghanistan.

1.6.2. United States Air Forces in Europe (USAFE) is responsible for instrument and radar procedure requirements in the geographical area covered by the High and Low Altitude Europe North Africa and Middle East (ENAME) FLIP, the High and Low Altitude Africa (Central & Southern Regions) FLIP, and the High and Low Altitude Eastern Europe and Asia (EEA) FLIP (West of E 88° longitude).

1.6.3. Air Education and Training Command (AETC), Air National Guard (ANG), Air Force Reserve Command (AFRC), Air Force Space Command (AFSPC), Air Force Special Operations Command (AFSOC), and Air Force Materiel Command (AFMC) are responsible for locations under their operational control.

1.6.3.1. **(Added-AFSPC)** HQ AFSPC/A3SR TERPS is responsible for the locations under their operational control for TERPS: Ascension Island Auxiliary Airfield, Cape Canaveral Air Force Station, Patrick Air Force Base, Thule Air Base, and Vandenberg Air Force Base.

1.6.4. Air Combat Command (ACC) is responsible for instrument and radar procedure requirements for locations under their operational control and for all AF instrument and radar procedure requirements in the geographical area covered by the High and Low Altitude Canada and North Atlantic (CAN & N ATL) FLIP. Additionally, ACC is responsible for instrument and radar procedure requirements for locations under the operational control of Air Force Global Strike Command (AFGSC).

1.6.5. Air Mobility Command (AMC) is responsible for locations under their operational control and for instrument and radar procedure requirements in the geographical area covered by the High and Low Altitude Caribbean and South America (CARIB & SA) FLIP.

1.6.6. Exceptions to the areas of responsibility outlined in paragraph 1.6 shall be documented in each applicable MAJCOM's supplement to this instruction or in a MOA made between or among the MAJCOMs involved, or between the MAJCOM and NGA, as applicable. Each MAJCOM participating in this type of agreement shall retain a signed and dated copy of it on file at the MAJCOM TERPS function and provide a digital copy to HQ AFFSA/A3A.

***Section 1B—General TERPS Definitions, Procedures, and Requirements***

**1.7. Holding Patterns.** Apply holding pattern requirements established in FAA Order 7130.3, *Holding Pattern Criteria*, FAA Order 8260.3, Volume 1, Chapter 2, Section 9, AATCP-1, PANS-OPS and as follows. Holding at (overhead) a Tactical Air Navigation (TACAN) facility is nonstandard regardless of the criteria being applied.

1.7.1. Develop all holding patterns to accommodate a holding airspeed of 310 knots indicated airspeed (KIAS). When an operational requirement exists, develop the holding pattern using the required airspeed (less than 310 KIAS) and publish this airspeed as the maximum airspeed on the planview of the procedure, adjacent to the holding pattern. Do not publish the standard holding airspeed of 310 KIAS or standard (timed) holding leg lengths on the planview. Note: For ICAO holding airspeeds, see Doc 8168 Vol II.

1.7.2. Select the maximum holding altitude based on the highest anticipated altitude that will be used by ATC.

1.7.3. At locations where the AF has instrument procedure development responsibility, advise military and FAA ATC facility management, including adjacent facilities with Approach Control responsibility, of all limitations (maximum speed and altitude) and any overlap of the holding pattern primary obstacle clearance area into the adjacent facility's airspace associated with each holding pattern.

1.7.4. Evaluate holding patterns based on the distance measuring equipment (DME) slant range effect regardless of the altitude specified or the difference between slant range and geographical distance. DME holding fixes may be established in tenths of a NM only when applying US TERPS criteria; PANS-OPS (ICAO/NATO) requires DME holding fixes to be established in whole NM values.

1.7.5. RNAV holding pattern criteria. Holding pattern development at an RNAV PFAF/FAF waypoint is not authorized. Use FAA Order 7130.3, Chapter 2, Conventional Holding Criteria, to develop RNAV holding with the following exceptions:

1.7.5.1. **Paragraph 2 3**, Navigational Aid (NAVAID) Ground and Airborne System Tolerance. Use basic holding pattern assumptions for GPS holding pattern development except use a constant fix error of 0.5 NM.

1.7.5.2. **Paragraph 2-12**, Fix Distances. When determining the appropriate RNAV holding pattern template, do not apply Table 7 from Chapter 6; use the 15-29.9 NM Fix-to-NAVAID Distance column of Table 2 Holding Pattern Selection Chart from Chapter 2.

1.7.5.3. Paragraph 2-19, DME Leg Lengths. Use Chapter 6, GPS Holding Patterns, paragraph 6-4, GPS Leg Length Determination, and Table 8 to determine maximum RNAV holding leg lengths. Determine RNAV holding leg lengths using along track distance (ATD) fixes only. Timing is not authorized for RNAV holding. **Notes:** There is no requirement for RNAV holding patterns to be associated with or aligned with any DME source. There is no TERPS criterion defining a "standard" RNAV holding leg length. All RNAV holding leg lengths shall be charted by NGA at each applicable holding pattern on the RNAV instrument procedure.

1.7.5.4. Do not apply the following to RNAV holding pattern development: **paragraphs 2.14**; **2.15**; **2.16**; **2.17**; **2.18**; **2.20**; **2.21**; **2.22**; Section 5, and p**aragraphs 2.31**; **2.34**; and **2.35**. Do not apply fix end or outbound end reduction areas to RNAV holding patterns.

1.7.6. Each holding pattern shall be documented on FAA Form 8260-2 IAW guidance in FAA Order 8260.19, *Flight Procedures and Airspace*.

1.7.7. Missed Approach Holding. When a holding pattern has been evaluated for a climb-in-hold and missed approach climb-in-holding is required, publish the information in the missed approach instructions IAW FAA Order 8260.19, paragraphs 8-56.f.(1) or 8-56.f.(2), as applicable.

1.7.8. Turbulent Air Holding. Turbulent air holding evaluations are required when holding airspeed is less than 280 KIAS. When applicable, provide all restrictions related to turbulent air holding to the ATC facility manager. See FAA Order 7130.3, Chapter 3, for additional guidance.

**1.8. Separating IFPs from Special Use Airspace (SUA) and Adjacent ATC Airspace.** To the maximum extent possible, develop and establish IFP primary obstacle clearance areas, to include holding patterns, within the lateral airspace boundaries assigned to the USAF ATC facility. When the primary obstacle clearance area extends into adjacent USAF, FAA or host nation airspace, advise appropriate ATC facility management. This is normally accomplished through procedure package coordination. Extension outside of SUA or within adjacent ATC airspace is permitted when one or more of the conditions in **paragraphs** 1.8.1, 1.8.2, or 1.8.3 exist.

1.8.1. The ATC facility with control responsibility for the instrument procedure is designated as the controlling agency for the SUA.

1.8.2. ATC radar is operational and used to ensure separation from the SUA. When ATC radar is required, the procedure must be noted appropriately, for example: **ATC RADAR required**.

1.8.3. A satisfactory airspace usage agreement has been established between the ATC facility with control responsibility for the instrument procedure and the controlling agency for the SUA. The usage agreement must detail all actions required by both parties to ensure separation between participating aircraft in the SUA (or the SUA itself) and non-participating aircraft. ***NOTE:*** Coordinate with the local military airspace manager for matters concerning SUA.

1.8.4. Ensure that a SUA check is performed on all procedures developed using GPD (except those developed with NATO or PANS-OPS criteria) prior to export (not applicable to ATC charts or diverse departure obstacle assessments). When the GPD SUA check indicates a violation that is justifiable with one or more of the conditions in paragraphs 1.8.1, 1.8.2, or 1.8.3, enter the details in the GPD Justification Tab. For example, "IAW AFI 11-230, paragraph 1.8.1, XYZ Approach Control is the controlling agency for R-3202A and for the instrument procedure." Completion of the Alternative Tab, Equivalent Tab, or Organization Tab is only required when pursuing a waiver.

1.8.5. To the maximum extent possible, develop and establish IFP primary obstacle clearance areas, to include holding patterns, within the lateral airspace boundaries assigned to

the USAF ATC facility. When the primary obstacle clearance area extends into adjacent USAF, FAA, or host nation ATC airspace, ensure the note "**ATC RADAR required**" is charted on the IFP.

1.8.5.1. The note in **paragraph** 1.8.5 is not required when an agreement (e.g., LOA) between the applicable ATC facilities outlines coordination procedures and control responsibilities during non-radar operations. Graphics detailing the penetration or overlap of the instrument procedure's primary obstacle clearance area into the adjacent facility's airspace should be available as support for the agreement.

1.8.5.2. When developing an instrument procedure in FAA controlled airspace, the FAA is responsible for coordinating control responsibilities in the event of radar failure.

**1.9. Documenting and Processing Navigational Fixes.** Apply requirements established in FAA Order 8260.19, Flight Procedures and Airspace, specifically; Chapter 2, Section 10, paragraphs 2-63, 2-64, and 2-65, and Chapter 8, Section 6, Radio Fix and Holding Data Record, as supplemented by this instruction. **Note:** When completing the "Reason for Revision" section, use a "from-to-reason" format. When a fix has moved, document the distance the fix has moved in ft or NMs to assist flight inspection in determining whether or not the fix needs to be re-evaluated. Example: "PAT 1 MIN holding altitude changed from 2000 to 3000; new controlling obstacle." Note: Obtain and publish a new fix name when moving a fix 1 NM or more unless operational requirements dictate otherwise (reference FAA JO 7400.2, Chapter 3, Section 3, paragraph 3-3-4.f.).

1.9.1. Document data required for holding and for named fixes on the Fix Report Generator (FRG) or on the AFFSA generated FAA Form 8260-2. Both documents are available on the AFFSA TERPS helpdesk. **Note:** References are embedded in the FRG for use when entering data.

1.9.1.1. For Non-RNAV patterns, ensure the FAA Form 8260-2 holding pattern value entered for "RAD/CRS/BRG" is the same as the "MAG BRG" value used in Fix Make-Up at the top of the form. The holding pattern "CRS INBOUND" value will always be exactly the same as the "MAG BRG" when holding away from the NAVAID/fix and will always be the reciprocal of "MAG BRG" when holding towards the NAVAID/fix.

1.9.1.2. For RNAV holding; enter the "Inbound Course" that was entered into the GPD Holding properties page as the "CRS INBOUND". The "RAD/CRS/BRG" will always be the reciprocal of "CRS INBOUND".

1.9.1.3. For non-RNAV procedures; when the MAP is not at landing threshold and cannot be designed as a DME fix or with another ground-based NAVAID solution, apply FAA Order 8260.19, paragraph 2-64 a.

1.9.1.3.1. For example; localizer procedures where the MAP is defined as a distance from the FAF and timing is used as the sole source to identify the MAP. In this case, develop and process a Computer Navigation Fix (CNF), i.e., obtain a non-pronounceable 5 letter fix name (beginning with "CF") via the helpdesk and process FAA Form 8260-2.

1.9.1.3.2. Where there is a DR route defined, establish a CNF at the intersection of the DR heading leg and the next segment. Document the CNF on FAA Form 8260-2.

1.9.1.3.3. In the examples above, GPD will not allow definition of the CNF during the IFP design phase, however, the GPD publication report will provide the coordinates for use on the FAA Form 8260-2. Annotate this process in the GPD designer notes and request charting of the non-pronounceable 5 letter fix name within parentheses (CNF).

1.9.2. Reference IFPs developed for CONUS locations, an FAA Form 8260-2 must be processed through AFFSA TERPS helpdesk for each named fix used on the instrument procedure prior to flight inspection. Each named fix must be processed by NFDC via NFDD for publication in NASR with an effective date that matches the publication date of the IFP. **Note:** Published holding pattern DME leg length fixes do not require naming.

1.9.3. Instrument procedures developed by the AF at OCONUS locations may be published in the DOD FLIP (Terminal) only after all required fix names have been approved by the host nation. If the fix name originated from the host nation, include that information in the AFFSA TERPS helpdesk incident.

1.9.4. Reserve all fix names and process all fix actions at both CONUS and OCONUS USAF locations as follows:

1.9.4.1. Open a Fix Processing incident on the AFFSA TERPS helpdesk for each requested fix action. Except when requesting or canceling a fix name, attach the GPD Build Report, GPD FLIP depiction and any additional source material (IAPA spreadsheet, etc…) as supporting documentation. All data on the 8260-2 must be supported by source. The incident must indicate the use of Active or Pending facility data to define fix make-up. **Note:** Multiple fix names may be requested via a single incident.

1.9.4.2. When requesting a fix name, AFFSA will obtain the fix name, update the helpdesk incident with the reserved name, and close the incident. The requesting MAJCOM has 90 days to submit a 8260-2 after fix name reservation. When the MAJCOM needs more than 90 days or a reserved fix name is not going to be used, notify AFFSA via email. Failure to contact AFFSA at the 90 day point may lead to the fix name reservation being canceled and the fix name returned to NFDC.

1.9.4.3. Submit the FRG or the AFFSA worksheet version of the 8260-2 to the AFFSA TERPS helpdesk at least 130 days prior to the proposed effective date via a new Fix Processing incident whenever establishing, modifying or cancelling a fix. **Note:** Establish an effective date and select it from the Proposed Effective Date dropdown box when submitting a fix for processing on the Helpdesk.

1.9.4.4. AFFSA will process the submission with the NFDC, send the signed FAA Form 8260-2 to the requestor, and close the incident. The NFDC NFDD cut-off schedule is contained in FAA Order 8260.26, Appendix A.

1.9.4.5. The NFDC will publish new and amended fixes in the NFDD for CONUS locations.

1.9.4.6. For OCONUS locations, the NFDC will not publish new and amended fixes via the NFDD but may retain the FAA Form 8260-2 in their internal database for fix name tracking purposes.

1.9.4.7. When publishing host nation procedures in the DOD FLIP (Terminal) and the host has not named all fixes IAW US criteria, do not obtain fix names for the host nation procedure; publish these fixes as they appear in the host nation source documentation.

1.9.4.8. When publishing fix names at US locations OCONUS in the DOD FLIP (Terminal), the fix name published at the US location shall not duplicate a host nation fix name. When made aware that this has occurred, the responsible MAJCOM shall take action to rename the US charted fix to eliminate any fix name duplication.

1.9.5. TERPS authority shall review the NFDD for accuracy and to determine when submitted fixes for CONUS locations are established, modified or cancelled.

1.9.5.1. The NFDD is published daily (except weekends and Federal holidays) by the National Flight Data Center (NFDC) and is available through the FAA Facility Aeronautical Data Distribution System (FADDS) at **http://nfdc.faa.gov/fadds/index.jsp** or by going to the NFDC website at **http://nfdc.faa.gov**.

1.9.5.2. Whenever the proposed effective date changes, notify AFFSA via email.

1.9.6. When the fix is located OCONUS, obtain approval for publication from the host nation prior to publishing the procedure in the DOD FLIP (Terminal). Document this coordination.

1.9.7. When submitting an instrument procedure to NGA for publication or revision, include a copy of each applicable, approved (signed by AFFSA, A.N.D., or the FAA), FAA Form 8260-2 for each fix. When applicable, ensure the procedure effective date (**paragraph** 2.10.3) in the NFDD matches the requested effective date sent to NGA. When there is an operational requirement to publish an instrument procedure prior to the effective date of the fix(es), apply **paragrap**h 2.10.4.

1.9.7.1. Ensure each Initial Approach Fix (IAF) and the Intermediate Fix (IF) are named and identified for charting on the planview in the documentation sent to NGA. The IF will be indicated on the planview by "(IF)" near the Intermediate Fix. **Note:** When the IF is co-located with the IAF, NGA will chart "(IAF/IF)" near the fix.

1.9.7.2. When using existing fixes maintained by another organization or MAJCOM on a new IFP or when revising a current IFP, submit fix name, IFP name, and airport four-letter ID via a new incident to the TERPS helpdesk. AFFSA will update the current FAA Form 8260-2 and close the helpdesk incident. For FAA owned fixes, see **paragraph 1.9.8**.

1.9.8. Using FAA fixes on USAF IFPs. Due to increased coordination and processing time, using FAA owned fixes on USAF IFPs is discouraged. This includes any action that requires a revision to the FAA Form 8260-2 to include adding or modifying holding. When required to use a fix owned by the FAA, the responsible MAJCOM TERPS authority must first obtain approval from the FAA ATO Service Areas' Operational Support Group, Flight Procedures Team (OSG-FPT). HQ AFFSA/A3A maintains the POC listing for OSG-FPT geographic regions on the HQ AFFSA Airfield Operations website at **https://cs1.eis.af.mil/sites/AFFSA/A3A/SitePages/Home.aspx**. Include an effective date in all correspondence with the FAA. The FAA OSG-FPT will forward the approved request to AeroNav Products to ensure all required changes or updates are made to the FAA Form

8260-2. **Note:** Do not establish a new fix in the same location as the FAA's fix to avoid this additional coordination.

**1.10. NAVAID Service Volume.**

1.10.1. Ensure that a NAVAID service volume check is performed on all non-RNAV procedures developed with GPD (not applicable to diverse departure obstacle assessments). Consider all flight inspected and any other known restrictions to NAVAIDs when developing instrument procedures. All courses and fixes of the instrument procedure shall fall within useable radials and useable ranges of the applicable NAVAID.

1.10.1.1. When any course or fix extends beyond the standard service volume of the applicable NAVAID, an ESV evaluation is required.

1.10.1.2. Holding Patterns. If the primary holding fix is within the service volume of the NAVAID, an ESV is not required. ESVs are not require when portions of the holding pattern other than the primary holding fix are outside the service volume of the NAVAID. Use this paragraph to justify GPD violations for holding inbound points beyond the service volume of the NAVAID.

1.10.2. When an ESV evaluation is indicated for US owned and operated NAVAIDs at AF locations CONUS where the AF has TERPS responsibility, the applicable TERPS function will access the on-line Expanded Service Volume Request form via the FAA's public web site at **http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/spec_management/library/esvms.cfm**. Download the ESVMS Military Module User Manual from the site and follow the directions for registering a new user. After successful registration and receipt of credentials by email, follow the user manual instructions for entering ESV criteria. Annotate the appropriate NAVAID 3-letter identification and frequency. Enter the remaining information on the on-line form as follows:

1.10.2.1. General Information. Enter the name of the point of contact (POC) and the street mailing address in the 'From:' space; include zip code. Enter the airspace docket number only if the request is associated with an airspace action. The 'State' space will be auto-filled with the two letter state abbreviation where the NAVAID is located.

1.10.2.2. Facility Data. Enter the Instrument Approach/Departure Procedure title in the 'Chart Name' field. For a new instrument procedure, enter the procedure name as specified in the flight inspection package. The remaining fields will be auto-filled in accordance with data stored in the system.

1.10.2.3. ESV Data. Enter the radial(s) required, the minimum and maximum mean sea level altitudes desired, and the nautical mile distances required. Enter all operational use requirements that are beyond the standard service volume. Enter altitudes as follows; '040' for 4,000 feet and '450' for 45,000 feet, etc.

1.10.2.3.1. The 'Requirement' space is limited to approximately 250 characters. It should contain a specific narrative addressing all requirements for flight inspection during the ESV evaluation.

1.10.2.3.2. The 'Routing Symbol' space is not used for electronic routing as may be expected and is limited to approximately 11 characters. Simply enter the MAJCOM office symbol i.e., HQ AMC/A3A.

1.10.2.4. Submit the completed ESV request by clicking the blue 'Submit' button at the bottom of the on-line form. When the ESVMS data submission request is successful, the system will assign a tracking number.

1.10.3. After a successful transmission of the ESV request, various email confirmations will be received as the request is being routed to the appropriate offices for updating in the ESVMS (e.g., the module will show both the date the request was sent to the Frequency Management Office (FMO) and the date the request was approved by the FMO, i.e., "SENT TO FMO" and "FMO APPROVED.") **Note:** Frequency management guidance can be found in FAA Order 6050.32, Spectrum Management Regulations and Procedures Manual. A phone listing of the FAA Regional Service Area Frequency/Spectrum Management Offices is posted at: **http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/spec_management/locations/fmos.cfm**.

1.10.3.1. Track the status of the request using the tracking number assigned during the initial submission to ensure the ESV request has been routed by the Flight Inspection Central Operations (FICO) office to the appropriate Flight Inspection Field Office (FIFO), i.e., "SENT TO FIFO." Print a copy of this single page of the module for inclusion in the flight inspection package; this serves as a simple reminder to flight inspection that an ESV is pending their evaluation.

1.10.3.2. Once a satisfactory ESV is obtained, official notification will be documented in the Flight Inspection Report and the ESVMS module will be updated by the FIFO, i.e., "FIFO APPROVE." Retain a print-out of the completed and approved ESV (Figure 1.1) in the procedure package. Ensure ESV results submitted to the FAA on the applicable facility data form are reflected in the FAA's AVN Datasheet System's website: **http://avnwww.jccbi.gov/datasheet**/. **Note:** An ESV requires specific 'NAVAID tuning' during the ESV flight evaluation. Coordinate all ESV flight inspection requests with the MAJCOM NAVAID maintenance office so they can ensure qualified maintenance personnel are available during the evaluation.

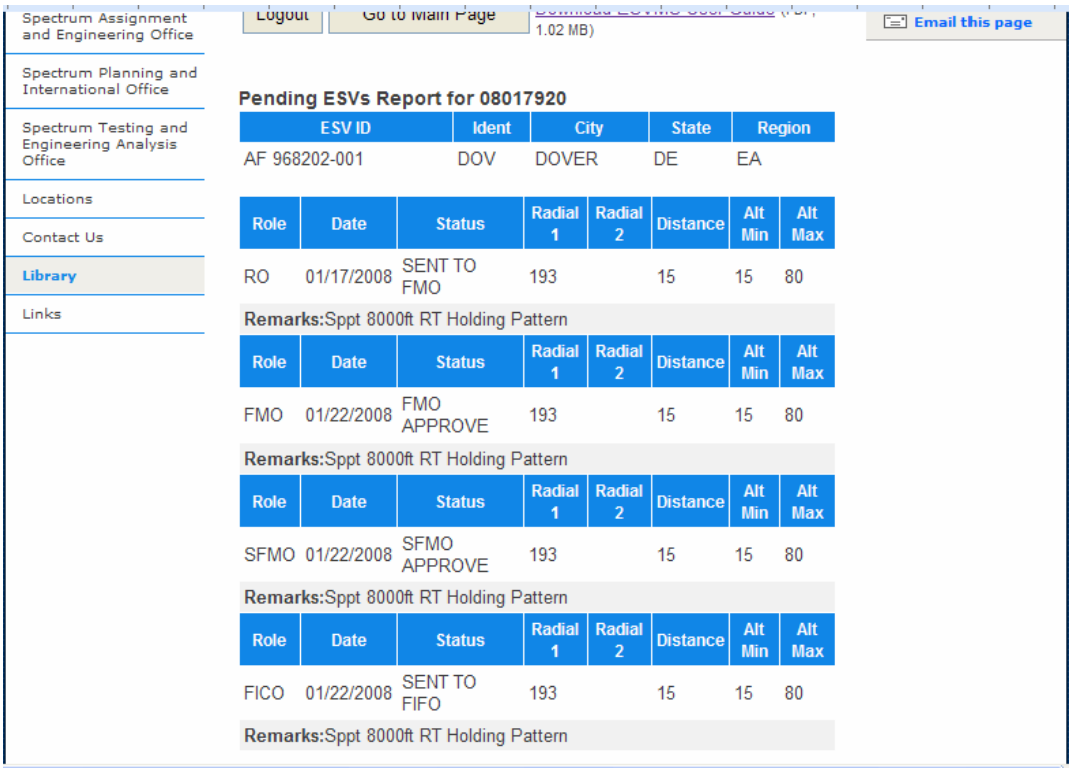
1.10.4. The applicable MAJCOM TERPS function will validate requirements for ESV evaluations on US owned and operated NAVAIDs at AF locations OCONUS where the AF has TERPS responsibility prior to sending an ESV request to the MAJCOM Spectrum Management Office.

1.10.5. ESV evaluations are not required on AF developed IFPs that incorporate segments or fixes established beyond the standard service volumes (established in FAA Order 8260.19) of host nation owned and operated NAVAIDs.

1.10.5.1. GPD is not currently performing service volume checks when using NATO/PANS-OPS (the "NATO" button in GPD) or ICAO/PANS-OPS (the "ICAO" button in GPD) criteria to design an IFP. Future versions of GPD will be programmed to perform service volume checks on IFPs developed using these criteria sets.

1.10.5.2. Until GPD is programmed to perform service volume checks when using either of the ICAO criteria sets, a manual service volume evaluation is required to determine whether or not an ESV request is required.

**Figure 1.1. CONUS Expanded Service Volume Approval Routing.**




**1.11. Airspace Action Requirements.** Within the US (and where required by host nation regulations), ensure each IFP's primary obstruction clearance areas are contained within controlled airspace. Document all efforts to obtain controlled airspace to support required IFPs. Where it is not possible to designate controlled airspace, annotate the procedure with an applicable note. Example note 1: "**CAUTION: Procedure not contained within controlled airspace**." Example note 2: "**CAUTION: Uncontrolled airspace below 700'/1200'** (or other altitude) **AGL**." Example note 3: "**CAUTION: Uncontrolled airspace beyond/within XX NM of** (airport name) **airport**." **Note:** Consider *continuously active* restricted areas as controlled airspace and apply **paragraph** 1.8.

1.11.1. Where controlled airspace exists, ensure all IFP altitudes are at least 300 feet above the floor of Class E airspace at the final approach fix, in all preceding segments, and in the clearance limit holding pattern.

1.11.2. Where controlled airspace to the surface exists, ensure all circling areas remain within the lateral confines of Class D and Class E Surface Areas and extensions to the maximum extent possible.

1.11.3. Advise the AFREP when new or revised instrument procedures require establishing or changing airspace.

1.11.3.1. Establish new airspace or change existing airspace to accommodate new or revised instrument procedures IAW AFI 13-201, *Air Force Airspace Management*, FAA Order 7400.2, *Procedures for Handling Airspace Matters*, and FAA Order 7610.4, *Special Military Operations*.

1.11.3.2. Coordinate with the local military airspace manager for matters concerning SUA.

1.11.4. Comply with the EIAP program guidance contained in Title 32, *Code of Federal Regulations*, Part 989, *Environmental Impact Analysis Process (EIAP)*. Complete Section I of AF IMT 813, *Request for Environmental Impact Analysis*, to initiate the EIAP when making altitude or flight track changes to existing instrument procedures or when developing new instrument procedures.

1.11.4.1. Use the website **http://www.gpoaccess.gov/ecfr**/ to access the Electronic Code of Federal Regulations. Click on the arrow at the first dropdown window and select 'Title 32 – National Defense' then click on the 'Go' button. Select the '800-1099' option under the 'Browse Parts' column. Scroll down and select Part 989.

1.11.4.2. As the proponent, pay particular attention to all of the responsibilities outlined in 32 CFR PART 989.3(c). Coordinate the AF IMT 813 through the Environmental Planning Function at the appropriate level for their evaluation of any effect the new or revised instrument procedures may have on the Air Installation Compatible Use Zone (AICUZ).

1.11.5. Retain all coordination and airspace documentation with the IFP.

**1.12. Epoch Year Magnetic Variation (MV) Values.**

1.12.1. Comply with FAA Order 8260.19, Chapter 2, Section 5, when implementing, maintaining, and updating Epoch Year magnetic variation (magvar) values on USAF owned and operated airports and NAVAIDs. Request current magvar for USAF locations via the TERPS Helpdesk (**paragraph** 2.16).

1.12.2. Notify HQ AFFSA/A3M (**hq.affsa.a3m.atcals@tinker.af.mil**) when the MV of record will change by 3° or more from the currently assigned value. MAJCOMs shall inform their applicable supported TERPS functions of the magvar change. The unit will propose a timeline and effective date for implementing the new magvar that coincides with a FLIP and DAFIF publication date. Allow sufficient time for all agencies to complete their required coordination and actions. All effected agencies must agree to the effective date before a reasonable timeline can be developed.

1.12.2.1. The MAJCOM will revise or implement the proposed timeline for updating the magvar of the airport or NAVAID(s), to include Airport Surveillance Radar (ASR) and Precision Approach Radar (PAR), and all affected instrument procedures with their supported unit(s). The effective date of the change may require additional coordination when the USAF owned and operated NAVAID is within the NAS or when runway renumbering is required. The effective date shall be established with enough lead time to ensure all affected NAVAID data and instrument procedures are modified to reflect the future Epoch Year magvar value on the effective date.

1.12.2.2. Once this timeline is established, the MAJCOM shall provide the revised magvar value and the effective date to the FAA, NGA and, for CONUS locations, to NFDC. The NFDC will ensure publication of the change in the NFDD. When there is a need to change the proposed effective date, the MAJCOM will coordinate the new date.

1.12.2.3. Digital Airport Surveillance Radar (DASR) systems are *normally* aligned to true north. Older DASR systems aligned to magnetic north will be realigned to true north by HQ AFFSA/A3MER when the assigned magnetic variation is updated. The operations support facility (OSF) will ensure the associated STARS equipment will display the proper radar presentation.

1.12.3. When host nation directives do not provide guidance for processing MV changes at USAF installations OCONUS, comply with this instruction to the maximum extent possible.

**1.13. Visual Flight Rules (VFR) Procedures.** When a flight procedure has not been evaluated to ensure compliance with TERPS criteria and has not been flight inspected, it shall not be flown in instrument meteorological conditions (IMC). These flight procedures are for use under USAF and ICAO VFR cloud clearance and visibility minima rules as stipulated in AFI 11-202V3, *General Flight Rules*, Chapter 7, and AFMAN 11-217V2, *Visual Flight Procedures*.

1.13.1. VFR procedures may be published in local flying directives or in a locally-produced loose-leaf format; they may also be sent to NGA for publication or charting in loose-leaf format.

1.13.2. When these procedures are developed by an AF instrument procedure designer, ensure the notes "**CAUTION: For use under VMC only**" and "**CAUTION: Pilot is responsible for terrain/obstacle avoidance**" are included in the planview of graphically depicted VFR procedures and in each VFR procedure published in textual format.

1.13.3. VFR procedure identification.

1.13.3.1. VFR procedures shall be identified IAW FAA Order 8260.3, Volume 1, Chapter 1, Section 6 as long as the procedure identification also indicates it is not useable during instrument meteorological conditions.

1.13.3.2. For clarity, include **(NOT FOR USE IN IMC)** in the procedure identification; e.g., "**SUMTER DEPARTURE (NOT FOR USE IN IMC)**" or "**TLS RWY 13 (NOT FOR USE IN IMC)**."

1.13.4. The entire minima line [minimum descent altitude (MDA), height above threshold/height above airport (HATh/HAA), decision altitude/decision height (DA/DH), ceiling and visibility] shall be replaced with the single abbreviation: "**VFR**".

1.13.5. VFR procedures published IAW paragraph 1.13 do not require flight inspection or waiver action.

**1.14. FAA Forms and FAA Publications Guidance.**

1.14.1. When unable to download FAA forms referenced throughout this instruction from FAA websites, they may be requested from the FAA forms officer via commercial fax number (202) 267-5407. The FAA forms officer will submit the request to the appropriate FAA program office. The program office will provide a copy of the requested form by either

faxing a hard copy or emailing an electronic copy. Ensure each request to the FAA forms officer includes the correct return email address and fax number.

1.14.2. FAA publications referenced in FAA Order 8260.3 and in this instruction are approved for AF use as stated. Example 1; FAA Order 8260.3, Volume 1, Chapter 2, Section 9 refers to FAA Order 7130.3 for holding criteria. Example 2; AFI 11-230 makes reference to FAA Order 8260.19 for instructions on filling out FAA Form 8260-2. The first example allows application of all criteria within FAA Order 7130.3, where the second example only allows application of a portion of FAA Order 8260.19.

1.14.3. AF TERPS functions shall not apply any guidance or criteria changes in FAA Policy Memorandums or TERPS Instruction Letters unless directed by HQ AFFSA via this AFI or via message.

1.14.4. FAA Facility Data Forms.

1.14.4.1. Complete and maintain the appropiate Facility Data Form IAW FAA Order 7900.2, Reporting of Navigational Aids, Communication Facilities, and Aviation Weather Systems Data to the National Flight Data Center, for each AF owned and operated NAVAID and VGSI system at the airport (including AF OCONUS locations). **Notes: 1.** Ensure the applicable data from this form is in the FAA's Aviation Systems Standards Information System (AVNIS) prior to submitting a FAA Form 8260-2 based on this data. **2.** Enter RPI distance to nearest hundredth of a foot and elevation to nearest tenth of a foot in the remarks section, Block IX for PAR facilities. **3.** The corresponding data in GPD must match completed and processed FAA Facility Data Form.

1.14.4.2. Completion and maintenance of the FAA Facility Data Forms is not required on host nation owned and operated NAVAIDs. When these NAVAIDs are used to develop AF instrument procedures OCONUS, use of this form is encouraged for documentation purposes. Provide either a completed form or a list consisting of the following data to the FAA no later than 3 weeks prior to a scheduled flight inspection. Include any known or published restrictions to the host NAVAID. Ensure changes to the host NAVAID data are provided to the FAA, as necessary, with any subsequent flight inspection requests.

1.14.4.2.1. NAVAID location (WGS-84 Lat/Lon).

1.14.4.2.2. Magnetic variation assigned to the NAVAID (if any).

1.14.4.2.3. NAVAID frequency/channel.

1.14.4.2.4. Facility class for Very High Frequency Omni-Directional Range Station (VOR), collocated VOR and TACAN Navigation Facilities (VORTAC), TACAN and Non-Directional Radio Beacon (NDB).

1.14.4.2.5. NAVAID owner (state, country, private company name, etc.).

1.14.4.2.6. Mean Sea Level (MSL) elevation at the base of the NAVAID's antenna and the vertical datum used to determine this elevation.

1.14.4.2.7. In addition to the general data above, provide the following specific information for host nation instrument landing systems. **Note:** the following references are to paragraphs and tables in FAA Order 7900.2, Appendix A.

1.14.4.2.7.1. Paragraph III (28)-(29) LOC Ant Type: see (29), and l; Equip Type: See (28).

1.14.4.2.7.2. Paragraph III (32)-(33), Distance from LOC Ant to AER runway end and, distance from LOC Ant to DER.

1.14.4.2.7.3. Paragraph III (35) LOC Course Width: Localizer commissioned width.

1.14.4.2.7.4. Paragraph IV (40): Glide Antenna ground elevation (MSL).

1.14.4.2.7.5. Paragraph IV (44) Glide Angle: Commissioned glide slope angle.

1.14.4.2.7.6. Paragraph IV (45) Glide Ant Type.

1.14.4.2.7.7. Paragraph IV (48) Glide Ant to AER.

1.14.4.2.7.8. Paragraph IV (49) Glide Ant Dist / Dir From Antenna to RWY C/L.

1.14.4.3. MAJCOMs shall review the data submitted, and establish an effective date for the revision(s). The effective date will be entered in Section IX (Remarks). Send completed Facility Data sheets to FAA AeroNav Support at: **9-amc-avn-avn210-data@faa.gov.** Request email confirmation from FAA AeroNav Support that all submitted data is correct, the data has been entered into AVNIS, and for them to provide the AVNIS printout. Upon receiving confirmation that all data is correct from AeroNav Support, submit completed forms or lists, as appropriate, as an attachment to the Airport Data Change (ADC) Form via the NFDC web site: **https://nfdc.faa.gov/nfdcApps/actions/PublicAction?action=showNewAdcForm**.
**Note:** When submitting the FAA Facility Data Form to AeroNav Support (NFDC West), ensure updated or changed item(s) are either addressed in a cover letter or highlighted directly on the form. Specify how the data is to be entered into AVNIS; either as 'active' (A) or 'pending' (P) data. When a NAVAID is decommissioned, notify FAA AeroNav Support to remove it from AVNIS.

1.14.4.3.1. Complete the Contact Information on the ADC Form with MAJCOM POC data.

1.14.4.3.2. Complete the Airport Change Details.

1.14.4.3.2.1. Select "Military" from the "Airport Data Change Type:" dropdown menu.

1.14.4.3.2.2. Select "OTHER" from the "Military Publication:" dropdown menu.

1.14.4.3.2.3. The MAJCOM TERPS function will determine the official to enter as the "Authorizing Official."

1.14.4.3.2.4. Enter "See attached FAA Facility data Form" or "See attached host nation NAVAID data list", as applicable, in both the "Revisions From:" and the "Revisions To:" text entry boxes.

1.14.4.3.3. Complete the Supporting Documents section of the ADC Form by uploading the applicable FAA Facility Data Form or the NAVAID data list.

1.14.4.4. When Terminal Aeronautical GNSS Geodetic Survey (TAGGS) data is available, it must be used to complete the applicable facility data blocks. Document the specific TAGGS data (survey name, date, etc.) and all other source data used to populate the FAA Facility Data Form in the "Remarks" section of the applicable form.. Previous facility data forms shall not be considered as source material. Retain all source documentation used to complete the form.

1.14.4.5. Courtesy copy HQ AFFSA/A3M (**HQ.AFFSA.A3M.ATCALS@tinker.af.mil**) whenever new or revised FAA Facility data Forms are sent to the FAA. Retain a copy in the local TERPS files and provide a copy to the applicable ATCALS maintenance function and to the Airfield Manager (or a designated representative).

1.14.5. FAA Form 7460-1, *Notice of Proposed Construction or Alteration***.** This form documents new construction and alterations to current obstructions. Title 14, *Code of Federal Regulations*, PART 77, *Objects Affecting Navigable Airspace* requires notification be provided to the FAA on proposed construction or alteration of structures that might present a hazard to flight. Copies of Obstruction Evaluation (OE) case studies and FAA determinations may be obtained from the FAA public website at **https://oeaaa.faa.gov/oeaaa/external/portal.jsp**. **Note:** In addition to notifying TERPS of proposed obstructions, the FAA and or the AF OE/AAA cell may coordinate notices for airport construction or new/modified IFPs at adjacent airports.

1.14.5.1. The appropriate FAA region will forward FAA Form 7460-1 to the affected military installation for evaluation and recommendations by the TERPS function.

1.14.5.1.1. Evaluate the proposal for impact to current and proposed terminal area IFR operations. When the proposal impacts IFR aircraft operations, instrument procedures, or minimum IFR altitudes, document all aspects of the impact in detail, determine alternatives, and coordinate the results with wing flying officials (AOF/CC, OG/CC, Stan/Eval, etc.).

1.14.5.1.2. Email the results of the evaluation to the OE/AAA cell member office within 14 working days of receipt. Cases marked “RUSH” have a 5 working day review suspense. Whenever a suspense cannot be met, request an extension from the USAF OE/AAA cell member.

1.14.5.2. The response should clearly state the extent of the impacts and when possible, provide acceptable solutions such as limiting the height of the structure to a specified height or relocating the structure. Characterize evaluation results as one of the following:

1.14.5.2.1. “No Objection.” When the evaluation results show no impact to IFR operations, notify the OE/AAA cell member that there are “no TERPS objections” to the proposal.

1.14.5.2.1.1. **(Added-AFSPC)** See **Attachment 11** for an example no adverse impact memorandum.

1.14.5.2.2. “No Objection with Provision.” Submit this response when the proposal will have an impact on IFR operations unless some mitigating action is taken.

1.14.5.2.2.1. Suggested mitigation (the ‘provision’) could include lowering the

proposed height, relocating the structure, supplying a better survey accuracy, or ensuring marking and lighting IAW AC 70/7460-1.

1.14.5.2.2.2. Include the following statement in the response when the evaluation indicates an object may become the controlling obstacle in any segment of an instrument approach procedure: "No Objection with Provision: request proponent contact (responsible TERPS function) at (enter applicable email address) within 7 days of start of construction."

1.14.5.2.2.3. After confirming construction has started, take the necessary actions to assure all affected IFPs are amended, as required. **Note:** FAA Form 7460-2, Notice of Actual Construction, are available from the FAA public site (paragraph 1.14.5). Once at the website; click on the "View Supplemental Notices (Form 7460-2)" tab on the left side of the page.

1.14.5.2.2.4. **(Added-AFSPC)** See **Attachment 12** for an example of a no objection with provision(s) memorandum.

1.14.5.2.2.5. **(Added-AFSPC)** An obstruction that requires amending the altitude in the intermediate or initial approach segment is not considered to have a substantial adverse effect, unless doing so would cause unreasonable descent gradients.

1.14.5.2.3. "Objection." When the proposed construction or alteration will impact IFR operations and mitigation is not possible, the response should state an "Objection" to the proposal. This response to a proposal should be used as a last resort when the construction project will have a substantial adverse impact upon IFR flight operations. Clearly define the adverse effect on the IFR aircraft operations; quantify the approximate number of operations affected (weekly or monthly). **Note:** Obtain endorsement of this response by wing flying officials (Director of Operations, Stan/Eval, etc.).

1.14.5.2.3.1. Document "Substantial Adverse Impact" (a significant number of aeronautical operations being impacted) and the reason(s) why the impact in this specific area rises to the level of being significant. For example; an obstruction that raises the procedure MDA or DA, penetrates the 40:1 departure surface or the visual portion of the final approach 20:1 OIS should be considered substantial adverse impact.

1.14.5.2.3.2. Conversely, an obstruction that requires amending the altitude in the intermediate or initial approach segment would not be considered to have a substantial adverse effect unless doing so would cause unreasonable descent gradients.

1.14.5.2.3.3. **(Added-AFSPC)** See **Attachment 13** for an example of an objection for substantial adverse impact memorandum.

**1.15. Special Notation Requirements.**

1.15.1. All Category II and III ILS procedures (including FTIP) require the following special notation: "**CATEGORY II (or III) ILS – SPECIAL AIRCREW AND AIRCRAFT CERTIFICATION REQUIRED**." Apply paragraph 2.11 when instrument procedures

other than CAT II or CAT III ILS procedures are considered special use and require special notation.

1.15.2. Instrument procedures published in true headings or in grid bearings versus magnetic headings are nonstandard and require waiver. The following note shall be included in the planview of all instrument procedures developed, published, or reviewed by the AF that use true headings: "**SPECIAL AIRCREW and AIRCRAFT AUTHORIZATION REQUIRED**."

1.15.3. On charts in the south latitudes where grid navigation is used, only grid bearings shall be shown and charts will be oriented to Grid North. The following note shall be included in the planview of all instrument procedures developed, published, or reviewed by the AF that use grid bearings: "**ALL BEARINGS AND DIRECTIONS ARE GRID**." **Note:** Special aircrew and aircraft certification and authorization requirements are the responsibility of the flying unit or MAJCOM flying authority. Except for CAT II and CAT III procedures, when any special aircrew and aircraft certification or authorization notes are annotated on the IFP, a method to contact the unit or MAJCOM flying authority will also be annotated on the IFP.

**1.16. Climb Gradients (CGs).** IAW AFI 11-202, Volume 3 and AFMAN 11-217, *Instrument Flight Procedures*, Volume 1, the standard climb gradient (CG) for aircraft executing a departure or a missed approach procedure is 200 ft/NM. When a rate of climb higher than 200 ft/NM is required for obstacle avoidance or to meet ATC restrictions, the climb rate required shall be specified on the procedure IAW Inter-Agency Air Cartographic Committee (IACC), NGA and DOD production specifications.

1.16.1. Specify a climb-to-altitude (CTA) or fix where the standard CG can be resumed whenever a climb rate (obstacle or ATC) higher than 200 ft/NM is published.

1.16.2. When a CG is required to avoid obstacles, it shall be identified as a "Minimum Climb Rate."

1.16.3. When a CG is required for an ATC restriction or for noise abatement, it shall be identified as an "ATC Climb Rate."

1.16.3.1. An ATC CG shall not be published in lieu of an obstacle driven CG that is also required.

1.16.3.2. There may be occasions when it is necessary to publish an ATC CG in conjunction with an obstacle driven CG. The ATC CG shall always be greater than the obstacle driven CG. **Note:** ATC CGs may be cancelled by ATC upon pilot request.

1.16.4. Departure and missed approach CGs greater than 200 ft/NM will also increase the slope of the associated obstacle clearance surface (OCS).

1.16.4.1. The formula used to calculate the slope of the OCS for a departure CG using the Standard Formula (**paragraph** 1.16.6) or for a missed approach using a formula from **paragraph** A4.17.1 or A4.17.2 is 0.76 times the CG ($OCS_{slope} = 0.76 \times CG$). For example: The slope of the OCS associated with a 300 ft/NM Standard Formula CG is 228 ft/NM ($0.76 \times 300 = 228$).

1.16.4.2. The slope of the OCS for a departure CG calculated using the DOD Option or for a missed approach CG using the formula from **paragraph** A4.17.3 is determined by

subtracting 48 ft/NM from the CG ($OCS_{slope}$ = CG − 48). For example: The OCS associated with a 300 ft/NM DOD Option CG is 252 ft/NM (300 − 48 = 252).

1.16.5. Missed Approach (MA) Climb Gradient (CG). MA CGs that exceed 200 ft/NM do not require a waiver to TERPS criteria.

1.16.5.1. Calculate MA CGs in the CONUS using the applicable (precision or nonprecision) criteria in **paragraph** A4.17. When a lower CG for locations in the CONUS is desired and can be achieved, use the OCONUS criteria from **paragraph** A4.17.3. When using the OCONUS option at a CONUS location, ensure the procedure is annotated "**NOT FOR CIVIL USE.**"

1.16.5.2. When an instrument approach procedure is developed for publication with an obstacle driven MA CG that exceeds 200 ft/NM, develop identical final and missed approach segments based on the same NAVAID to the same runway with an adjusted MDA/DA that allows a standard MA CG (200 ft/NM or less).

1.16.5.2.1. Publish both lines of minima on a single instrument procedure (one line of minima will support the MA CG that exceeds 200 ft/NM and the other supporting the standard MA CG) or publish two separate instrument procedures. When charted on a single plate, label any minima that requires a missed approach CG in excess of 200 ft/NM as follows: "BELOW MINIMA REQUIRES A MISSED APPROACH CLIMB GRADIENT OF XXX FT/NM."

1.16.5.2.2. When unable to comply with paragraph 1.16.5.3 by adjusting the MDA/DA, develop a separate instrument procedure to the same runway with the necessary adjustments (i.e., move the MAP, adjust the MDA/DA, change the MA procedure, etc.) to allow a standard MA CG. Identify this second procedure IAW FAA Order 8260.3, paragraph 161.a. (e.g., TACAN Z RWY 32).

1.16.5.2.3. When there is not enough space to chart the required lines of minima on one procedure plate, publish two separate instrument procedures (e.g., publish the localizer separately from the ILS or publish the TACAN separately from the VOR/DME).

1.16.6. Departure Climb Gradients. Departure climb gradients (ATC or obstacle driven) that exceed 200 ft/NM do not require a waiver. Apply the Standard Formula from FAA Order 8260.3, Volume 4, Chapter 1, paragraph 1.4.1, when calculating departure climb gradients in the CONUS. When a lower climb gradient can be achieved and is desired for locations in the CONUS, apply the DOD Option from FAA Order 8260.3, Volume 4, Chapter 1, paragraph 1.4.1. The DOD Option shall also be applied to all departure procedures OCONUS including host nation locations and all OCONUS locations where the AF exercises TERPS authority. ***NOTE:*** Whenever the DOD Option formula is used, annotate the procedure "**NOT FOR CIVIL USE"** on the planview of the graphic or in the Delta T (▼) section of the DOD FLIP (Terminal). Annotate in the IFP design notes that the DOD option is being applied. Include all manual calculations (clearly indicating which option is being applied) in the IFP package.

1.16.7. Determine vertical velocity (V/V) for departure and missed approach climb gradients that exceed 200 ft/NM. The result of either the Standard Formula or the DOD Option Formula establishes the baseline climb gradient used to determine V/V. Climb gradients

expressed in feet per nautical mile (ft/NM) shall be converted to a climb rate expressed in feet per minute (fpm) prior to publishing in the Vertical Velocity chart.

1.16.7.1. The V/V is determined by dividing the ground speed increment for the V/V chart by 60 and then multiplying the calculated climb gradient by the result. Round the result up to the next 1-foot increment and publish that value for the 60 knot ground speed increment as the V/V.

1.16.7.2. Example: the V/V for 60 knots based on a computed climb gradient of 253.39 ft/NM would simply be published as 254 fpm (60 ÷ 60 = 1. 1 × 253.39 = 253.39). The V/V for 120 knots based on the same climb gradient (253.39 ft/NM) would be published as 507 fpm (120 ÷ 60 = 2. 2 × 253.39 = 506.78). Based on this example, the published V/V for 180 knots would be 761 fpm; the V/V for 240 knots would be 1014 fpm, etc.

**1.17. Procedural Information.** Procedural information includes the following: any fix, radial, bearing, course, track, distance, altitude, minima, controlling obstacle, holding pattern, climb table, time/distance table, and changes to any procedure identification, any operational note, or to any caution note depicted on an IFP. All other information depicted on an IFP or FTIP is considered non-procedural information. Changes made to procedural information depicted on any IFP or FTIP are referred to 'procedural changes' throughout this AFI.

**1.18. Displaced Threshold Procedures.** Instrument procedure designers shall revise instrument procedures as necessary when the threshold is displaced temporarily and operations will continue to the affected runway. Make adjustments only to those procedures considered mission essential. **Note:** Evaluating existing precision instrument procedures with GPD may not be possible as the location of the displaced threshold may place the GS, the runway point of intercept (RPI) and Ground Point of Intercept (GPI) into the displaced portion of the runway.

1.18.1. Enter the amount of threshold displacement, temporary runway length, and the displaced threshold elevation into GPD using the Data Manager application. When the displaced portion of the runway is not available for departure roll, change the DER of the opposite direction runway on the Runway Supplementary Data Tab to match the coordinate and elevation of the displaced threshold. Exit Data Manager and run the Auto Eval Tool on all mission essential procedures. ***NOTE:*** When the airport elevation was based on the displaced portion of the runway, update the airport elevation in the aerodrome properties with the new value based on the shortened runway.

1.18.2. When the Auto Eval results in a glidepath qualification surface (GQS) penetration, precision obstacle free zone (POFZ) penetration, lower than standard threshold crossing height (TCH) or wheel crossing height (WCH), or when the location of the displaced threshold places the GS, RPI, and GPI into the displaced portion of the runway, existing precision procedures must be NOTAMed not authorized. The associated localizer approach may be used as a stand-alone localizer procedure. **Note:** When this is the case, coordinate with Airfield Management personnel to suspend ILS operations, except localizer only, via NOTAM.

1.18.3. Do not apply credit for the approach lights when determining visibility minima. When reverting to no-light minima, ensure the revised MAP to threshold distance is included in the NOTAM, when required.

1.18.4. VGSI systems, i.e., visual approach slope indicator (VASI); precision approach path indicator (PAPI); or pulse light approach slope indicator (PLASI), may be unavailable for the same reason as the ILS. Ensure the applicable VGSI system is NOTAMed appropriately when this is the case.

**1.19. Published Altitudes.** All published altitudes shall provide at least the minimum required obstacle clearance (ROC), plus ROC adjustments when applicable, appropriate for the segment or the sector. This policy applies to all IFP segments, all minimum safe/sector altitude (MSA) and emergency safe altitude (ESA) sectors and to all ATC chart sectors, *regardless of established altitude rounding guidance*. Unless otherwise noted, all altitudes listed in a procedure package will be charted as an "at or above" altitude. Document the rationale for charting an altitude as an "at" or as an "at or below" altitude.

# Chapter 2

## REQUESTING, PROCESSING, PUBLISHING AND MAINTAINING IFPS

### *Section 2A—Terminal Amendment System (TAS)*

### 2.1. TAS Letter Processing.

2.1.1. The MAJCOM will send a TAS letter to NGA specifying the effective date when submitting a new procedure, deleting a procedure, or when making procedural change(s) to an IFP currently published via loose-leaf or in the DOD FLIP (Terminal). Use a separate TAS letter in the format specified in Attachment 8 or Attachment 10 for each new or amended IFP. ***NOTE:*** Except in extreme circumstances when safety of flight dictates, do not request effective dates for SIDs, STARs, or graphic ODPs with center-assigned codes (CID) that fall on the change notice (TCN) cycle date.

2.1.2. A single TAS letter may be used when requesting deletion of multiple IFPs from a single location. The letter only needs to identify the airport, the IFP(s) to be deleted, the effective date, and a POC. ***NOTE:*** List each IFP being deleted individually in the body of the letter.

2.1.3. Requests to NGA for the initial publication of new IFPs may be limited to a TAS in cover letter format that identifies the IFP to be published IAW the documentation attached, and a POC. Include a request for NGA to annotate the IFP as original ("Orig") in the margin information, as required.

2.1.4. When making any procedural change(s) to a currently published IFP, the TAS letter will document each change required; multiple changes may be made in a single amendment. Assign a number to each amendment, beginning with the number one.

2.1.4.1. Indicate the amendment number in the procedure properties of GPD and ensure the TAS letter requests NGA to change "Orig" to "Amdt 1" or to update the amendment number to the next amendment number, as appropriate, on each instrument approach, to include radar instrument approaches.

2.1.4.2. Textual Obstacle Departure Procedures (ODPs) also require the 'Orig' or 'Amdt (number)' notations. With the exception of Host Nation developed IFPs, amendment numbers on graphic ODPs and SIDs are not authorized. Name and amend graphic ODPs and SIDs IAW FAA Order 8260.46. When publishing Host Nation IFPs, do not modify the IFP name to meet the requirements in FAA Order 8260.46. In this case, amendment numbers may be appropriate for tracking changes.

2.1.4.3. When requesting publication of new procedures or when amending currently published procedures, ensure the TAS letter specifies the following, as necessary; charting of QFE (altimeter setting above station) heights, Special Use Airspace, obstacles, coordinate data, operational notes, Approach Lighting System (ALS) inoperative notes, etc. Be as specific as possible and include as much data as possible in the TAS letter to increase the accuracy of the published procedure.

2.1.5. Foreign Terminal Instrument Procedures (FTIP). MAJCOM TERPS functions shall submit all new instrument procedures and procedural changes to existing procedures to

NGA IAW **paragraph** 2.1 and guidance contained in paragraph 5 of the "Working Agreement Between NIMA [sic] and DOD Flight Information Coordinating Committee (FCC) On Processing Foreign Terminal Instrument Procedures (TERPS)."

2.1.5.1. Process revisions to non-accredited FTIPs IAW **paragraph 2.14**. Original signatory coordination is not required

2.1.5.2. Process revisions to special accredited and accredited FTIPs IAW **paragraphs 2.12.3.2** and **2.14**. Original signatory coordination is not required.

2.1.6. When requesting publication of new procedures and when amending currently published procedures at all host nation locations (FTIP), ensure the TAS letter specifies the charting of one of the four following instrument procedure design rules used by the host nation;

2.1.6.1. **TERPS.** Procedure designed in accordance with US or former NATO military criteria.

2.1.6.2. **MIPS.** Procedure designed in accordance with NATO military instrument procedures standardization implemented by AATCP-1.

2.1.6.3. **PANS-OPS.** Procedure designed in accordance with ICAO DOC 8168, Volume II.

2.1.6.4. **NATIONAL XXX.** Procedure designed in accordance with national specific criteria, with XXX being the ICAO abbreviation for the country, e.g., NATIONAL CAN.

***Section 2B—IFP Processing***

**2.2. Identifying Requirements.** The MAJCOM TERPS function shall establish user guidance for requesting new IFPs and for changing or deleting existing IFPs. Include the following items (at a minimum) in this guidance:

2.2.1. Name of the airfield or location desired.

2.2.2. Type of procedure. Examples: High or Low Altitude, VOR; ILS; and TACAN.

2.2.3. Runway number(s) of the requested procedure(s).

2.2.4. Aircraft categories that will use the procedure.

2.2.5. Special requirements. Detail specific features or capabilities needed, for example, termination fix for a departure, fix at which the instrument procedure should commence, and avionics features that influence procedure design.

2.2.6. Date procedure required, and when appropriate, date no longer needed.

2.2.7. Designation and address of organizations or units requesting the procedure.

2.2.8. Email address of where to send procedures published via loose-leaf format. ***NOTE:*** Procedures published by NGA in the loose-leaf format are not normally coded in DAFIF and therefore may not be available for GPS or any FMS using DAFIF.

2.2.9. The requesting agency may recommend, with justification, the inclusion of existing civil IFPs and publication of new IFPs at domestic civil airports IAW FAA Order 8260.32.

**2.3. RESERVED.**

**2.4. Contingency Operations and Deployed TERPS.** Process requests to support contingency operations IAW this chapter and the following:

2.4.1. The responsible MAJCOM (**paragraph** 1.6) performing the contingency TERPS tasking shall develop and process the required IFP(s). This MAJCOM will also be responsible for maintaining the IFP(s) for the duration of the operation.

2.4.1.1. These procedures can be published in DOD FLIP (Terminal) or in a loose-leaf format. ***NOTE:*** Procedures published by NGA in the loose-leaf format may not be coded in DAFIF and therefore may not be available for GPS or any FMS using DAFIF.

2.4.1.2. This MAJCOM shall also be responsible for coordinating all required IFP changes with the original requesting agency for as long as necessary to support the operation. Timely coordination of changes is essential to flight safety.

2.4.2. The requesting agency shall provide an email address of where to send procedures published via loose-leaf format. The MAJCOM OPR shall forward the appropriate AF IMTs to NGA IAW Table 2.1 for loose-leaf publication. Subsequent distribution to aircrews of the NGA produced loose-leaf product shall be made by the requesting agency.

2.4.3. MAJCOM TERPS functions may submit a Crisis/Combat Support request to NGA when there is an urgent need. Identify the request as a "TERPS Crisis/Combat Support Request."

2.4.3.1. NGA will provide a loose-leaf copy of the IFP to the requesting MAJCOM for review and approval. The MAJCOM will distribute the final, approved, IFP in the loose-leaf format. When the IFP is required on a permanent basis, the MAJCOM may request its publication in the DOD FLIP (Terminal) by NGA. **Note:** Requests for procedures in loose-leaf format shall not be used to circumvent the normal production process outlined in FLIP General Planning (GP).

2.4.3.2. When NGA is unable to support a short notice request, MAJCOMs may manually produce, locally process, and use the required IFP(s) until the NGA product is available. Manually produced and locally published IFP(s) shall be developed to match the DOD FLIP format (planview, profile, minima data block, etc.) to the maximum extent possible, contain an expiration date, a point of contact, and, if applicable, operation name and the unit designation(s) of authorized users.

2.4.4. Use of NGA provided Stereo Airfield Collection (SAC) data. During contingency operations or at locations where standard geodetic survey data sources are not available, the use of SAC derived data is permitted to develop special use, nonprecision IFPs. The MAJCOM TERPS function must first exhaust and document all efforts to obtain standard geodetic data source prior to implementing this guidance. The use of SAC data does not make an IFP nonstandard or require waiver processing.

2.4.4.1. When DTED and DVOF are available for the contingency location, supplement this data with SAC data provided by NGA. Obtain the SAC data by requesting a "baseline airfield collection" from NGA. This collection consists of an obstacle search within the defined airfield boundaries (Figure 2.2) via SAC methodology.

2.4.4.2. When DTED and DVOF are not available for the contingency location, request a "baseline airfield collection" supplemented with an obstacle search that includes the military airport surfaces (Figure 2.3). Perform a map study to identify the controlling obstacle for each segment of the procedure IAW AFI 11-230, **paragraphs** 3.15.2 and 8.4.6.2. ***NOTE:*** Information about airport surfaces can be found in UFC 3-260-01.

2.4.4.3. When the NGA supplied SAC data does not include a statement of vertical and horizontal accuracies, apply standard accuracy values based on the map study when entering the data into GPD data manager; otherwise apply the accuracy values provided with the SAC data.

2.4.4.4. When coordinating the instrument procedure with the approval authority, clearly identify all SAC derived data (facility, aerodrome, runway, obstruction locations, heights, etc.) used to develop the procedure; include any NGA provided vertical and horizontal accuracies.

2.4.4.5. Authorization to fly any special use IFP (**paragraph** 2.11) developed using SAC data is restricted to those aircraft under the operational control of the approving commander. The MAJCOM A3 or equivalent will sign the AF IMT 4342 as the "Senior Operational Commander".

**Figure 2.1. Baseline Airfield Collection Area**

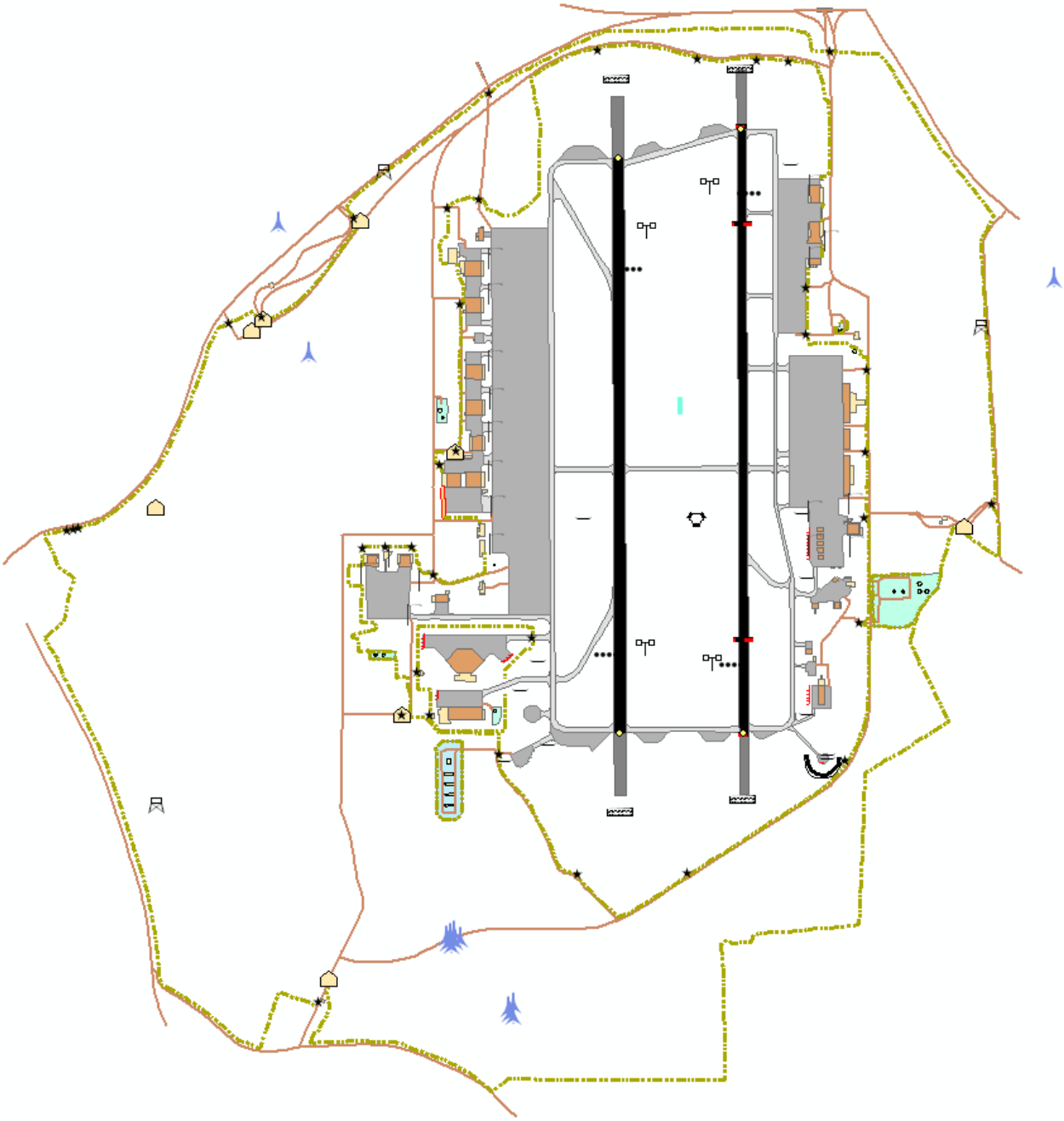
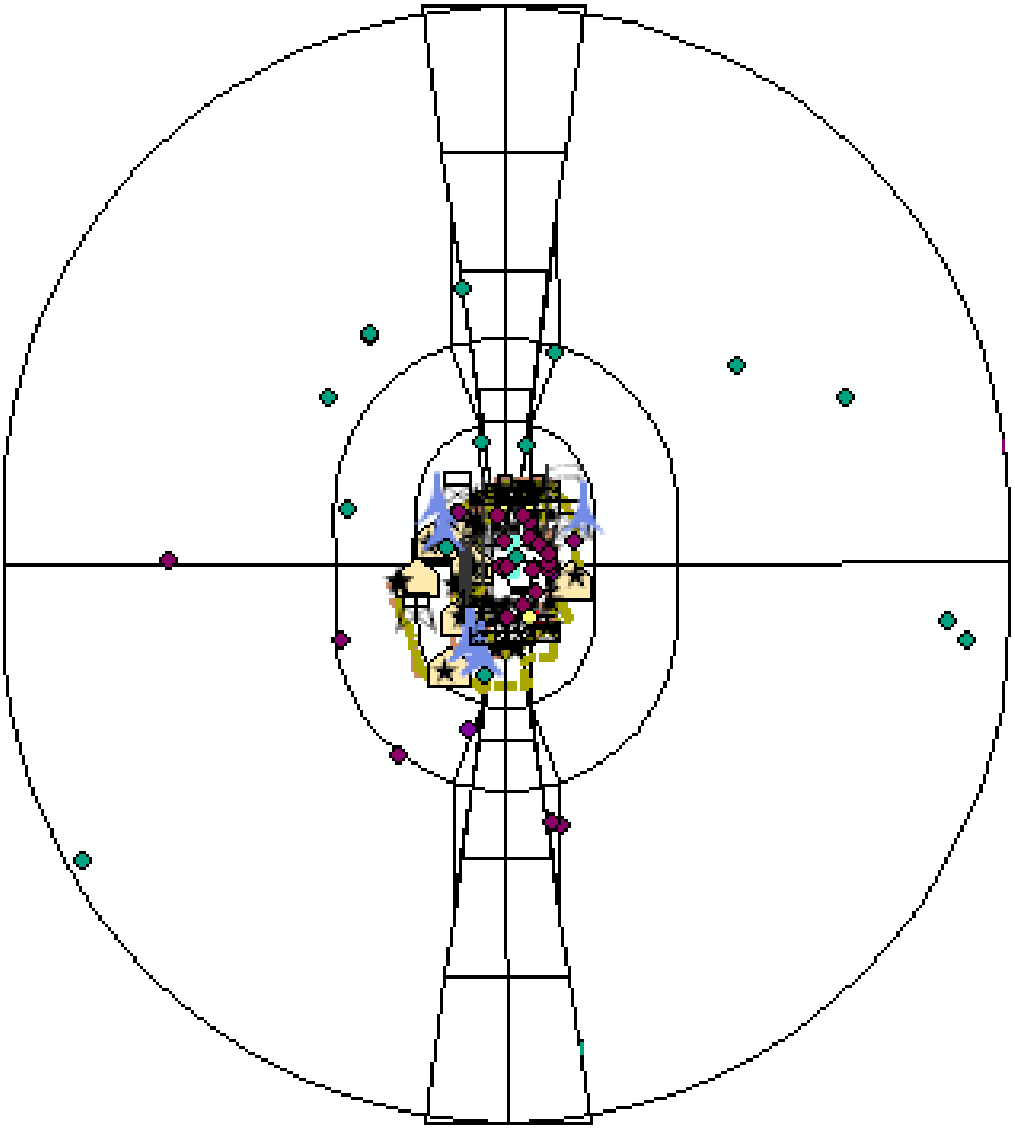


**Figure 2.2. Baseline Airfield Collection Area and Military Airport Surfaces.**



**2.5. Nonstandard IFPs (Waiver Requests).**

2.5.1. Unless specifically noted within this AFI, deviation(s) from any instrument procedure criteria in AFI 11-230, AATCP-1, ICAO PANS-OPS, or from any authorized FAA criteria, must be submitted to the appropriate MAJCOM A3 (or a designated representative) for approval consideration. This requirement applies to instrument flight procedures published by the AF via loose-leaf or in the DOD FLIP (Terminal), and to foreign instrument procedures based on non-accredited host nation source published by the AF. Obtain waiver approval for nonstandard IFPs prior to flight inspection.

2.5.2. Procedures developed for the AF by the FAA at domestic civil airports that do not meet US TERPS criteria shall be processed IAW FAA Order 8260.32.

2.5.3. Except for the requirements listed below, MAJCOM authorities will determine waiver documentation and processing requirements.

2.5.3.1. Use of AF IMT 3980, *Instrument Procedure Waiver*, (**paragraph** 2.6) is required. Multiple criteria deviations pertaining to a single standard or criteria may be combined into one entry on the AF IMT 3980.

2.5.3.2. Each violation listed in the Violations, Warnings, Notes, etc. section of the GPD build or publication report must be justified. Each justification for a violation to instrument procedure criteria shall specify the reason(s) an exception to criteria is required. Phrases such as "Operationally advantageous", "Provides an operational advantage" or "Because the pilots want to do this" will not meet this requirement; a short description of the operational gain is needed. For example, when developing holding in mountainous terrain: "Holding pattern obstacle clearance was reduced to 1000 feet to meet descent gradient criteria between the IAF and the IF". Each violation that cannot be properly justified requires waiver.

2.5.3.3. Complete documentation and supporting data (Table 2.1) shall accompany the waiver request to allow reviewing offices to conduct an evaluation without additional research. Include documentation stating the procedure was developed using the most current criteria (or the current version of GPD) and the most current aeronautical data.

2.5.3.4. The waiver authority (MAJCOM A3 or designated representative) may restrict or limit the use of a nonstandard procedure. The waiver authority may, at their discretion, annotate the planview IAW FAA Order 8260.3b, paragraph 141 or with the specific MAJCOM or flying unit approved to use the procedure as follows: "**FOR USE BY** (specific MAJCOM or flying unit(s), exercise or operation, as appropriate) **ACFT ONLY**."

2.5.4. Submit a copy of the approved waiver to HQ AFFSA/A3A to facilitate trend analysis.

**2.6. AF IMT 3980/AF Form 3980.** Use either AF IMT 3980 or AF Form 3980 (GPD produced) to document violations to instrument procedure criteria and request approval for an equivalent level of safety as determined by the requesting TERPS function.

2.6.1. Procedure Name. Also include Airport Name, 4-letter ICAO ID, City, State or Country, and, when applicable, the amendment number.

2.6.2. Specific Directive and Paragraph To Be Waived. Document the specific criteria violated and the condition that is creating the violation (i.e., "FAA Order 8260.3, Volume 1, paragraph 242b(1); intermediate segment for CAT C/D/E aircraft less than 6 NM"). **Note:** Multiple violations to the same criteria may be grouped together and entered as a single violation.

2.6.3. Reason For Waiver *(Justification)* and Operational Impact, If Not Approved. Be specific when stating the operational impact; do not use the fact that a procedure has existed for a number of years to justify the waiver. Example: "Historical weather data shows that ceilings below 500 feet and visibilities below 2 miles occur approximately 95 days per year. At approximately 10 sorties a day, this equals a loss of approximately 950 sorties per year; seriously degrading training capability and mission readiness."

2.6.4. Alternative*(s)* Considered and Reason For Rejection. Document the alternative(s) considered to eliminate the need for the waiver and state why each was not accepted.

2.6.5. Equivalent Level of Safety Provided. See FAA Order 8260.3, Volume 1, paragraph 141. An equivalent level of safety is a compensating measure to insure the deviation from criteria does not have an adverse impact to the safe operation of aircraft. The TERPS function requesting the waiver *must* establish an equivalent level of safety for each criterion deviation included in the request. Provide a statement explaining how the compensating measure would provide an equivalent level of safety sufficient to deviate from the established criterion without affecting flight safety. An example equivalent level of safety would be a warning note published on the procedure. **Note:** The fact that the criteria violation has existed for a number of years does not provide an equivalent level of safety.

2.6.6. Submitted By. The person that designed or reviewed the nonstandard procedure should be indicated in this item.

2.6.7. Comments *(MAJCOM TERPS)*. The MAJCOM TERPS Office will have the first opportunity to recommend approval or disapprove the waiver request or waiver renewal request.

2.6.7.1. When the MAJCOM disapproves the request, the reason must be stated in this item.

2.6.7.2. The first disapproval will end the processing phase and the package will be returned to the originating office through the coordination chain.

2.6.8. MAJCOM FLYING OPERATIONS (Stan/Eval) ENDORSEMENT. This endorsement is required to ensure that a designated MAJCOM flying operations authority (Stan/Eval or MAJCOM determined equivalent) has the opportunity to review the validity of the waiver request. Disapproval of the waiver request at this level requires documentation of the reason in the "Comments" portion of this item.

2.6.9. HQ AFFSA ACTION. HQ AFFSA will not have any action in the waiver approval process. Process waivers IAW current MAJCOM guidance.

***Section 2C—Publishing IFPs***

**2.7. IFP Documentation Requirements.** The instrument procedure designer responsible for an IFP shall create and maintain either hard copy or soft copy procedure package folder or airport data folder relative to the IFP. Manually developed instrument procedure packages shall contain all documentation, as applicable, from Table 2.1. When automating an IFP with GPD, include the following documentation.

2.7.1. Hard copy (paper) documentation includes the computer generated Approach/Departure Publication and Build Reports, Workspace Report, FLIP graphic depiction, monthly Auto Eval Reports, and AF IMT 4342, *Approach/Departure Signature Page*. For procedures developed on AF bases with a CE function, also include a completed AF IMT 813, *Request for Environmental Impact Analysis*. For AF developed IFPs, except as noted elsewhere in this AFI, the following are the minimum required coordination signatures:

2.7.1.1. Instrument procedure designer

2.7.1.2. AOF

2.7.1.3. Senior Operational Commander

2.7.1.4. MAJCOM

2.7.1.5. Flight Inspection

2.7.2. Retain all hard copy source documentation relating to aeronautical or obstacle data revisions pertinent to the IFP. Include correspondence between the unit and the MAJCOM TERPS function that provides rationale for any change(s). Also retain the TAS letters concerning the currently published version of the IFP with the procedure package folder.

2.7.3. Electronic (digital) documentation includes the following mandatory contents of the [procedure name] GPD export folder: **Note:** Ensure all required electronic files are selected prior to export and save to the workstation's hard drive.

2.7.3.1. [workspace name]-wks.pdf

2.7.3.2. [procedure name]-[date]-DEF.ipd

2.7.3.3. [procedure name]-BLD.pdf

2.7.3.4. [procedure name]-FLIP.pdf

2.7.3.5. [procedure name]-Flyability.pdf (when required)

2.7.3.6. [procedure name]-OBS.txt (only applicable when manual obstacle changes have been made)

2.7.3.7. [procedure name]-PUB.pdf

2.7.3.8. [procedure name]-Waiver.pdf (when applicable). There will be one waiver document for each nonstandard condition and they will be labeled sequentially. Retain waiver documentation as part of the procedure package.

2.7.3.9. [procedure name]-AutoEval.pdf.

2.7.4. In addition to GPD-produced export files, retain additional electronic documentation (to include scanned versions of hard copy documentation outlined in **paragraph** 2.7.2) relating to aeronautical or obstacle data revisions pertinent to the IFP. Include correspondence between the unit and the MAJCOM TERPS function that provides rationale for any IFP change(s). Also retain the TAS letters concerning the currently published version of the IFP with the instrument procedure package. Note that only the completed signature page (AF IMT 4342) must be scanned and saved to electronic media, not the entire Procedure Report.

2.7.5. MAJCOM and unit TERPS functions shall maintain documentation relative to each instrument procedure developed by the FAA IAW FAA Order 8260.32 at domestic civilian airports and subsequently published in the DOD FLIP (Terminal). Include the initial letter requesting development of the instrument procedure and all succeeding forms and paperwork to include the TAS letters concerning the currently published version of the IFP. **Note:** Send the following minimum documentation to NGA when requesting publication; TAS Letter, FLIP graphic depiction, and all applicable FAA 8260 forms.

2.7.6. **(Added-AFSPC)** HQ AFSPC/A3SR TERPS will develop and maintain electronic folders for each base in the AFSPC Area of Responsibility. At a minimum, they should contain the following information:

2.7.6.1. **(Added-AFSPC)** PROCEDURE FOLDERS

2.7.6.2. **(Added-AFSPC)** NOTAMS

2.7.6.3. **(Added-AFSPC)** ATCALS INFORMATION

2.7.6.4. **(Added-AFSPC)** FLIGHT INSPECTION

2.7.6.5. **(Added-AFSPC)** CE PRODUCTS

2.7.6.6. **(Added-AFSPC)** SURVEYS

2.7.6.7. **(Added-AFSPC)** OE AND WAIVERS

2.7.6.8. **(Added-AFSPC)** magvar

2.7.6.9. **(Added-AFSPC)** .OBS FILES

2.7.6.10. **(Added-AFSPC)** ARCHIVE

2.7.7. **(Added-AFSPC)** AFSPC TERPS will develop and maintain electronic procedure folders for each IFP and chart required at each base in the AFSPC Area of Responsibility. At a minimum, they should contain the following information:

2.7.7.1. **(Added-AFSPC)** CURRENT FLIP

2.7.7.2. **(Added-AFSPC)** PROCEDURE SIGNATURE PAGES

2.7.7.3. **(Added-AFSPC)** CURRENT GPD EXPORTED FILES

2.7.7.4. **(Added-AFSPC)** FLYABILITY, ENVIRONMENT IMPACT and FLIGHT INSPECTION FORMS

2.7.7.5. **(Added-AFSPC)** PROCEDURE COORESPONDENCE and WAIVERS

2.7.7.6. **(Added-AFSPC)** OVERLAYS and MAPS

2.7.7.7. **(Added-AFSPC)** FAA FORM 8260-2s

2.7.7.8. **(Added-AFSPC)** PROCEDURE ARCHIVE

2.7.7.9. **(Added-AFSPC)** PROCEDURE ACTION TRACKING LOG

2.7.8. **(Added-AFSPC)** Electronic records should be backed up in a separate electronic location once per month (such as separate hard drives) for redundancy. Paper records are not maintained in AFSPC for TERPS.

**2.8. Publication of RADAR Procedures.**

2.8.1. PAR and ASR approaches are normally published in text format in the “RADAR INSTRUMENT APPROACH MINIMUMS” section of the DOD FLIP (Terminal). When an operational requirement exists, they may be published in the graphic format.

2.8.2. Do not develop or publish a descent angle or a descent gradient for ASR approaches.

2.8.3. Unless published in the graphic format, do not develop or publish an ESA or an MSA for any RADAR procedure.

**Table 2.1. Minimum IFP Package Content Requirements (see next page for Notes).**

| Coordinating Function ↓ | Standard IFPs (Note 6) ↓ | Nonstandard IFPs (Note 6) ↓ | FTIP – Standard IFPs (Notes 5 & 7) ↓ | FTIP – Nonstandard IFPs (Notes 5 & 7) ↓ |
|---|---|---|---|---|
| MAJCOM TERPS → | AF IMT 4342/4343 | AF IMT 4342/4343 | AF IMT 4342/4343 | AF IMT 4342/4343 |
| | Computation Data (See Note 1) | Computation Data (See Note 1) | Computation Data (See Note 1) | Computation Data (See Note 1) |
| | Maps/Charts/Drawings (See Note 1) | Maps/Charts/Drawings (See Note 1) | Maps/Charts/Drawings (See Note 1) | Maps/Charts/Drawings (See Note 1) |
| | ESV Document (as required) | ESV Document (as required) | Supporting Documents (See Note 2) | Supporting Documents (See Note 2) |
| | FAA Form 8260-2s | FAA Form 8260-2s | Procedure Log (See Note 3) | Procedure Log (See Note 3) |
| | Supporting Documents (See Note 2) | Supporting Documents (See Note 2) | AF IMT 3992/3993 | AF IMT 3992/3993 |
| | Procedure Log (See Note 3) | Procedure Log (See Note 3) | GPD Workspace Data Report | GPD Workspace Data Report |
| | AF IMT 3992/3993 (as required) | AF IMT 3992/3993 (as required) | | AF IMT 3980 |
| | AF IMT 813 | AF IMT 813 and AF IMT 3980 | | |
| | GPD Workspace Data Report | GPD Workspace Data Report | | |
| MAJCOM/A3 (or equivalent) → | N/A | AF IMT 4342/4343 (See Note 1) and AF IMT 3980 | N/A | AF IMT 4342/4343 (See Note 1) and AF IMT 3980 |
| Jeppesen, NGA, and AeroNavData → | TAS Letter (See Note 4) | TAS Letter (See Note 4) | TAS Letter (See Note 4) | TAS Letter (See Note 4) |
| | FLIP graphic depiction | FLIP graphic depiction | FLIP graphic depiction | FLIP graphic depiction |
| | GPD Publication Report | GPD Publication Report | GPD Publication Report | GPD Publication Report |
| | Signed FAA Form 8260-2s | Signed FAA Form 8260-2s | | |
| | ARINC 424 Coding | ARINC 424 Coding | | |

**Note 1**. Printouts of the computer generated Workspace Data Report and the entire contents of the [procedure name] export folder saved to electronic media replace manual computation sheets and manual procedure drawings for instrument procedures automated with GPD. Also see paragraph 2.7 for additional documentation requirements.

**Note 2**. Supporting documentation includes all documentation that supports the IFP (i.e., coordination letters, maps, flight inspection report, manual computations not on AF IMTs, build report, etc.). Include notations when sources of obstacle data, computed values, and nonstandard criteria can cause misunderstanding by reviewing levels. Appropriate host nation AIP information for a foreign procedure and information obtained by agreement with the host nation are also required as supporting documentation. Ensure all host nation documentation not published in English and used to develop the procedure is translated IAW paragraph 3.16; include a copy of the translation in the procedure package.

**Note 3**. The procedure log is required to track procedural changes (TAS letters), reviews, Auto Eval results and to document all other actions taken to keep the instrument procedure current.

**Note 4**. Use the TAS letter format as outlined in paragraph 2.1 when submitting instrument procedures to NGA for publication or revision.

**Note 5**. Listed content requirements are for FTIP based on non-accredited host nation source being published in the DOD FLIP (Terminal). See paragraphs 3.21 and 3.29 for other package content requirements. When sending accredited and special accredited FTIP to NGA for publication, include a TAS Letter and a FLIP graphic depiction (paragraph 4.2.1.4).

**Note 6**. Listed package content requirements do not apply to IFPs developed by the FAA IAW FAA Order 8260.32; apply paragraph 2.7.5.

**Note 7**. Do not send any FTIP to Jeppesen or AeroNavData.

## 2.9. Coordination Requirements for Standard, Manually Developed IFPs.

2.9.1. When the amount of manual computations, drawings, and other hard copy documentation required in these packages make it impractical to transfer them electronically, process in accordance with Figure 2.1 via surface mail.

2.9.2. When using paper maps for map studies, apply paragraph 1.5.9 and use current, appropriately scaled paper maps for each segment of the procedure as defined in Table 4.1, when available. Use the next lowest map scale when the scale required is not available.

## 2.10. IFP Publication Responsibilities.

2.10.1. Submit all new and revised IFPs to the NGA FLIP mailbox (**taps@nga.mil**) IAW this AFI, as required, and as shown in Figure 2.1; include required documentation from Table 2.1.

2.10.2. Establish an effective date for each new, revised, or cancelled IFP and navigational fix.

2.10.2.1. Coordinate the effective date with all concerned agencies (NGA, NFDC, FAA, etc.) to ensure aeronautical charts and supporting data are not published in the DOD FLIP (Terminal) until after a successful flight inspection and all published procedural data is correct. When necessary, apply paragraph 2.10.5.

2.10.2.2. The effective date for IFPs, aeronautical data, and for navigational fixes shall coincide with the effective dates established IAW the Aeronautical Information Regulation and Control (AIRAC) system. These effective dates can be found in the DOD FLIP, *General Planning (GP)*, Chapter 11, paragraph 11-7, *Revision Schedules*. When the effective date needs modification after coordination but prior to publication, establish a new publication date and ensure all agencies (NGA, Jeppesen, AFFSA, etc.) are advised of the new timeline.

2.10.3. When unable to comply with paragraph 2.10.3.1, ensure the caveat "**EFFECTIVE BY NOTAM**" is charted on new or revised IFPs when required to publish in the DOD FLIP (Terminal) under the following conditions (***NOTE:*** do not use this caveat for more than 90 days):

2.10.3.1. Before all applicable fix names are published in the NFDD.

2.10.3.2. Before being flight inspected.

2.10.3.3. Before required waiver approval.

2.10.3.4. Before DAFIF data is updated to match the data used to develop the instrument procedure.

2.10.4. Issue a NOTAM stating the procedure is authorized for use immediately following successful flight inspection, verification that all requested updates to DAFIF have been made, waiver approval, or publication of all required fixes in the NFDD, as applicable. The NOTAM shall include any changes required by flight inspection or the waiver approval authority. All IFPs (except those that can not be coded) require the completion of ARINC 424 coding prior to this NOTAM action. **Note:** See AFI 11-208(I) for additional NOTAM guidance.

**2.11. Special Use IFPs.** A special use IFP is defined as a procedure developed and maintained IAW this AFI for a unique operational requirement and published by NGA. When the special use IFP is published in a loose-leaf format, the effective start and termination dates must be indicated in the margin. ***NOTE:*** Once completed by NGA, instrument procedures published via loose-leaf format are not updated by NGA. All changes or updates, procedural and non-procedural, to any IFP published via loose-leaf format must be made via a TAS letter to NGA.

2.11.1. Special use IFPs must state: "**FOR USE BY** (specific MAJCOM or flying unit(s), exercise or operation, as appropriate) **ACFT ONLY**" in the planview. **Note:** Other aircraft and DOD components may use these procedures only after receiving approval from the MAJCOM A3 (or a formally designated representative) responsible for the development and maintenance of the procedure (**paragraph** 1.3.4).

2.11.2. Special use procedures that do not meet applicable criteria (nonstandard procedures) must receive waiver approval prior to being published or used.

***Section 2D—Maintaining IFPs***

**2.12. FLIP Maintenance.**

2.12.1. Establish a Flight Information Publication (FLIP) maintenance system (checklist(s), operating instruction(s), etc.) to ensure all IFPs (including FTIP) published in the DoD FLIP

(Terminal) remain current and meet applicable criteria. The supporting MAJCOM TERPS function is responsible for maintaining IFPs at locations where a unit instrument procedure designer is not assigned or available.

2.12.1.1. When a unit instrument procedure designer is not assigned or available, establish a clear avenue of communication with a POC at the location to enhance timely requests for new instrument procedure development or changes to currently published IFPs. Each POC must be thoroughly briefed on the specific data (determined by the MAJCOM) that needs to be reported to the MAJCOM to keep instrument procedures current; pertinent changes to the airfield environment should be included.

2.12.1.2. MAJCOM TERPS functions shall establish a method to track each IFP, each fix, and each waiver to criteria applicable to the IFPs published in the MAJCOM TERPS AOR (paragraph 1.6). Also track IFPs developed at domestic civil airports by the FAA at the request of the AF or the NGB IAW guidance outlined in FAA Order 8260.32 and published in the DOD FLIP (Terminal).

2.12.2. Initiate GPD Auto Eval on each workspace and all active (currently published or pending publication) IFPs after ingest of new aeronautical data (DTED, DVOF, DAFIF, or SRTM) or after manual edits are processed.

2.12.2.1. **(Added-AFSPC)** After completion of GPD Auto Evaluation, document results on Procedure Tracking Log in the respective procedure folder. Keep a copy of the Auto Eval run in the Terps Continuity Folder for at least one year unless changes to the procedure are necessary.

2.12.3. When publishing FTIP in the DoD FLIP (Terminal), the MAJCOM should attempt to establish a host nation POC to coordinate changes, resolve questions, etc., as necessary, to ensure published FTIP are kept current.

2.12.3.1. Review host nation source documentation when received for procedural changes to IFPs published in the DOD FLIP (Terminal). Document all host nation procedural changes in a TAS letter and comply with **paragraph** 2.1.

2.12.3.2. Check the following source documents on a daily basis:

2.12.3.2.1. Host nation AIP revisions. Compare new information against the old information and against what is currently published in the DOD FLIP (Terminal) or posted on the HQ AMC Global Decision Support System (GDSS).

2.12.3.2.2. US and host nation NOTAMs.

2.12.3.3. Document all discrepancies found, corrective actions taken, and the review completion date in the procedure package.

2.12.3.4. Maintain as much source information as possible in the applicable procedure package.

2.12.3.5. Whenever possible, perform a full review of host nation source documentation in advance of its effective date. Notify NGA of any procedural changes to published instrument procedures required prior to the applicable cut-off dates established in DOD FLIP, *General Planning (GP)*, Chapter 11, *Revision Schedules*, for inclusion in the

appropriate publication cycle. To the maximum extent possible, ensure the DOD procedure is published and effective on the same date as the host nation procedure.

2.12.3.6. When host nation changes will be effective before the next DOD FLIP (Terminal) cycle, ensure a NOTAM is issued documenting the required changes to the DOD FLIP (Terminal). Notify NGA of the required changes via the TAS letter and either cancel or revise the NOTAM after the changes are published in the DOD FLIP (Terminal). Also apply **paragraph** 3.28.1 when applicable.

**2.13. Review of Flight Information Publications and Other TERPS Related Data.**

2.13.1. Prior to the effective date, the responsible TERPS function shall complete a Post Publication Review (PPR) of all DOD FLIP (Terminal) and NGA produced loose-leaf products where the AF has either maintenance or publication responsibility. A thorough review of the initial publication of new or revised IFPs is required to ensure the information published by NGA mirrors the IFP as documented by the instrument procedure designer.

2.13.1.1. When errors are found in procedural information, regardless of the version in which the error was made (paper or electronic), take the following actions:

2.13.1.1.1. Initiate the appropriate NOTAM(s) IAW AFI Interservice Publication 11-208, *Department of Defense Notice to Airmen (NOTAM) System*.

2.13.1.1.2. Initiate a PPR letter (Attachment 9).

2.13.1.2. Document FLIP review results IAW specific MAJCOM guidance.

2.13.1.2.1. **(Added-AFSPC)** Ensure review of FLIP products is conducted within 5 days of FLIP cycle to ensure accuracy and currency of all FLIP products. Document results in Procedure Tracking Log in the respective procedure folder.

2.13.2. Annually review revised Base Civil Engineering Comprehensive Planning Maps and GIS equivalent and GeoBase CIP Foundations for planned or completed changes in airfield layout, facilities, lighting, etc., and new information, to determine the effect (if any) on current or proposed IFPs.

2.13.3. **(Added-AFSPC)** NOTAMs for each operational location will be checked weekly using the Defense Internet NOTAM System (DINS) at **www.notams.jcs.mil**. This ensures procedural NOTAM changes are tracked and maintained no longer than 90 days and any airfield changes and/or construction is tracked by the TERPS specialist.

**2.14. Revising IFPs.** Submit revisions to procedural information (**paragraph** 1.17) on currently published IFPs to NGA via the Terminal Amendment System (**paragraph** 2.1). When a change is made to the graphic depiction of the IFP in either the planview or profile, inclusion of an annotated graphic is encouraged for clarification.

2.14.1. Coordinate changes to procedural information with all original signatory agencies and offices except as noted in **paragraph** 2.14.3.

2.14.2. After the revised IFP has been flight inspected, a NOTAM or a message may be used to amend the IFP with the required change(s) prior to it being published in the DOD FLIP (Terminal).

2.14.2.1. Specify the DOD published IFP by name and amendment number in the NOTAM for currently published instrument approach procedures or textual ODPs. Except for ODPs and SIDs, include "Original" or the applicable amendment number. Use the current name of the graphic ODP or SID when amending these procedures via NOTAM.

2.14.2.2. Identify the procedural changes in the NOTAM followed by the phrase "THIS IS (procedure identification) AMENDMENT NUMBER (next amendment number in sequence)."

2.14.2.3. Examples:

2.14.2.3.1. VOR RWY 31 AMDT 6. 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. THIS IS VOR RWY 31 AMDT 7.

2.14.2.3.2. ILS RWY 10R ORIG. CIRCLING MDA 1420/HAA 559 ALL CATS. THIS IS ILS RWY 10R AMDT 1.

2.14.2.4. Ensure this NOTAM is cancelled when the amended IFP is published in the DOD FLIP (Terminal).

2.14.3. When the only change to an IFP is a change to the controlling obstacle as listed in the controlling obstacle table of the GPD Publication Report and no other changes are required (i.e., minima increase/decrease, VDP location, descent angle, etc.), full processing of a revised IFP package through all signatories is not required. Process this change as an amendment as follows:

2.14.3.1. Update the affected procedure package with;

2.14.3.1.1. The revised GPD Publication and Build Reports and

2.14.3.1.2. A new AF IMT 4342 signed as described in **paragraph** 2.14.3.2 and

2.14.3.1.3. The updated GPD produced FLIP depiction and

2.14.3.1.4. All updated flight inspection maps showing the location of the new controlling obstacle and

2.14.3.1.5. An updated FAA Form 8260-2 when the new controlling obstacle is located in a holding segment.

2.14.3.2. Retain the original AF IMT 4342 signature page and the original GPD Publication and Build Reports with the procedure package along with the revised AF IMT 4342 signature page. The new AF IMT 4342 for the controlling obstacle change only needs the following approval authority signatures:

2.14.3.2.1. The instrument procedure designer

2.14.3.2.2. MAJCOM TERPS

2.14.3.2.3. Flight Inspection

2.14.3.3. Provide written notification (memorandum for record or similar type of written notification) of the controlling obstacle change and that no other changes to the published

procedure are required to the following (retain a copy of the notification with the instrument procedure package):

2.14.3.3.1. Airfield Operations Flight Commander

2.14.3.3.2. Civil Engineering (Environmental & AICUZ)

2.14.3.3.3. FAA or Host Nation (when applicable)

2.14.3.3.4. Senior Operational Commander

2.14.3.4. Forward a copy of the revised procedure package to the MAJCOM. The MAJCOM shall:

2.14.3.4.1. Review the revised instrument procedure package (perform MAJCOM Review as defined in Attachment 1);

2.14.3.4.2. Process the new controlling obstacle data with the FAA when it changes FAA Form 8260-2 holding documentation (as applicable);

2.14.3.4.3. Forward a complete flight inspection package to Flight Inspection.

2.14.3.4.4. When the controlling obstacle changes in the final approach segment, forward a TAS letter as outlined in **paragraph** 2.1 to NGA for charting of the new controlling obstacle. Charting other obstacles is at the discretion of the MAJCOM TERPS authority.

2.14.4. When the only required changes to an IFP are an increase to landing minima, an increase to a fix crossing altitude, a change to the VDP location, a change to the descent angle, or a change to an operational or caution note, a NOTAM may be issued that amends the IFP prior to flight inspection only under the following conditions:

2.14.4.1. The AOF/CC, OG/CC and the MAJCOM TERPS function, as applicable, are notified of the procedural change(s) prior to issuing the NOTAM;

2.14.4.2. The required change does not create a nonstandard condition. **Note:** When changes are permanent, process a revised procedure package and ensure the NOTAM is cancelled when the changes are published correctly.

**2.15. Deleting IFPs from DOD Publications.**

2.15.1. When a request to delete an IFP is received, coordinate deletion of the IFP with other interested agencies and using organizations (transient and tenant flying units, MAJCOM, DOD, FAA, host nation, etc.). **Note:** Do not consider the absence of a reply as concurrence; follow-up with each interested agency or using organization for a response before deleting the instrument procedure from the DOD FLIP (Terminal).

2.15.2. When an FTIP published by the AF is deleted from host nation source (AIP or other host document) or after determining an AF developed and maintained IFP is no longer required, the MAJCOM TERPS office will send the appropriate TAS letter to NGA, include all AFFSA processed 8260-2s for any fixes being cancelled. Courtesy copy this TAS letter (include any attachments) to Jeppesen and to AeroNavData.

*Section 2E—Data Management*

**2.16. TERPS Helpdesk.** Submit requests for GPD license keys, navigational fix names, magnetic variation information, information on FAA NAVAIDs (to include magnetic variation and any other data), initial and revalidation requests for host nation accreditation, and suspected problems or recommendations for GPD software enhancements to HQ AFFSA via the AFFSA TERPS helpdesk. When the helpdesk is not operational, contact HQ AFFSA/A5C via DSN 339-9544 or via email at **hqaffsa.a.5.8@tinker.af.mil.** AF Form 847, *Recommendation for Change of Publication*, may also be submitted via the AFFSA TERPS helpdesk as an attachment to an incident when requesting changes to AFI 11-230.

**2.17. Digital Data.** Digital products that support IFP development and review include DAFIF, DVOF, DTED (Level 1 or Level 2, as required), the NACO digital Visual Flight Rules (VFR) Sectionals (**http://aeronav.faa.gov/index.asp?xml=aeronav/applications/VFR/chartlist_sect**), raster map and imagery products (Compressed Arc Digitized Raster Graphics [CADRG] and Controlled Image Base [CIB]), and vector products (Urban Vector Map [UVMAP] and Vector Map [VMAP] 0 – 1), as deemed necessary. **Note:** Shuttle Radar Topography Mission (SRTM) data may be used when DTED is not available or when determined to be operationally advantageous.

2.17.1. When used during procedure development, provide updated obstacle data (revised description, height, coordinates, etc.) directly to the Imagery and Obstructions Branch of the Aeronautical Division (PVA) of NGA via email at: **quality@nga.mil.** **Note:** The Obstructions Team at PVA is responsible for updating the DVOF database.

2.17.2. Include updates to DAFIF and any additional aeronautical data used in the development of an IFP that are not reflected in the current DAFIF when submitting the TAS letter to NGA.

2.17.2.1. Document airport magvar changes, NAVAID magvar changes, and DAFIF updates on the FAA hosted Airport Data Change (ADC) website (**https://nfdc.faa.gov**). Supporting documents may be attached if necessary. Upon receipt, HQ AFFSA/A3OF will process the form and the OPR will receive confirmation. Retain the processed copy with the IFP documentation. **Note:** The effective date will be entered by HQ AFFSA/A3OF and will be the effective date from the appropriate revision schedule published in the current DOD FLIP General Planning (GP) document.

2.17.2.2. After DAFIF publication, ensure all requested data changes have been made and all DAFIF data matches the data used to develop the published IFP. Follow-up with NGA to adjudicate and resolve all data discrepancies between DAFIF and corresponding data in the GPD publication report on or before the procedure effective date. When requested changes to DAFIF are not complete or made in error, notify HQ AFFSA/A3OF at: **hqaffsa.a3of@tinker.af.mil** and take any required NOTAM action. A new submission to the FAA hosted Airport Data Change (ADC) website is not required; HQ AFFSA/A3OF will re-process the original submission through NGA. **Note:** DAFIF data is used to populate various DOD aircraft navigation databases. When using data other than the data contained in DAFIF to develop instrument procedures, the published paper product will not match the digital data used by the aircraft for navigation. Tracking

changes and updating the data in DAFIF when developing IFPs is essential to flying safety.

2.17.2.3. Using GPD Data Manager, import updates to aeronautical and obstacle data upon receipt. **Note:** NGA distributes DAFIF and DVOF every 28 days. DTED and other products are updated as necessary by NGA and NACO. Ensure the DTED disk being used is current by checking the National Stock Number against the Defense Supply Center Richmond web page (**www.aviation.dla.mil/rmf**/) listing (click on "Digital") at least once every 28 days.

2.17.2.3. **(AFSPC)** Ensure DVOF and DAFIF ingests are completed within 5 days of distribution cycle (unless otherwise informed that the files are corrupt or unusable) to ensure accuracy and currency of all procedures and charts. Document results in procedure tracking logs and save the Auto Eval run in appropriate continuity folder.

2.17.2.3.1. Make manual edits as necessary based on OE/AAA case studies, new construction, NAVAID changes, host nation AIP changes, NOTAMs, etc. After new data is imported, and after manual edits are processed, initiate the Auto Eval Tool to check each saved procedure in the workspace to determine whether the data changes will require revisions to published procedures. Justification supporting manual edits and additions to obstacle data shall be annotated in the GPD Obstacle Properties Notes tab. When the Auto Eval tool indicates a change has taken place, restore the procedure using Procedure Designer to determine the extent of the changes. When procedural changes are necessary, export the procedure and process an amendment. Document the completion of the Auto Eval on the hard copy or electronic Procedure Log. **Note:** Auto Eval checks critical data elements (i.e., minimum segment altitudes, courses, violations, etc.) recorded in the electronic procedure file compared against the same data elements from a "virtual" build of the saved procedures. It is not the same as restoring the procedure. Each time a procedure is opened, it is 'restored' and re-evaluated based on the current data environment. Auto Eval is limited to checking those instrument approach and departure procedures that GPD currently supports.

2.17.2.3.2. Auto Eval does not check ATC charts (MVACs and MIFRACs) for changes after data import or after revisions to data. Each saved chart shall be restored in GPD Chart Designer after data update or revision *and manually compared to the previous chart* for new sector altitudes and violations.

2.17.3. Aeronautical dataset differences. When runway construction, unprompted aeronautical database changes, etc., cause data disparities between the IFP build report or official source survey data and the DAFIF or AVNIS aeronautical databases, consider the following tolerances to the location of the runway threshold when determining appropriate NOTAM action:

2.17.3.1. +/- 50 ft or less longitudinally.

2.17.3.2. +/- 10 ft or less laterally.

2.17.3.3. +/- 3 ft or less vertically.

2.17.3.4. Changes that exceed the tolerances above require immediate NOTAM action to ensure safety and procedural currency.

2.17.3.5. Implement corrective actions to harmonize aeronautical databases, source survey data, and flight check documentation.

**2.18. Geospatial Information and Services (GI&S).**

2.18.1. Geodetic surveys establish source documentation for obstructions, topographic data, and aeronautical data. They are required at all AF owned or operated locations within the Continental United States (CONUS) and outside the CONUS where the AF develops and maintains terminal instrument procedures (not including FTIP locations). Use current source data relating to aeronautical or air traffic control and landing systems (ATCALS) surveys, NAVAID and radar siting, obstructions (on- and off-aerodrome), and all correspondence relating to manual revisions to aeronautical data. Terminal Aeronautical Global Navigation Satellite System (GNSS) Geodetic Survey (TAGGS) data should be used when available. Whenever source documentation is not derived from a TAGGS survey, submit the source documentation to AFFSA/A3A. AFFSA/A3A will coordinate with NGA for inclusion of the source documentation into the TAGGS program.

2.18.2. AF locations with terminal instrument procedures that have never had a TAGGS geodetic survey shall obtain geodetic survey support IAW AFI 14-205, *Geospatial Information and Services (GI&S)*, paragraph 10.3.The responsible TERPS function must coordinate with local Airfield Management and Civil Engineering authorities to confirm items to be surveyed (e.g., runway threshold location, runway edges, NAVAIDs, airfield obstacles, etc.) prior to the TAGGS survey. **Note:** Survey specifications are contained in the NGA Airfield Survey Specification Document for the Terminal Aeronautical Global Navigation Satellite System (GNSS) Geodetic Survey (TAGGS) Program. Current geodetic airfield surveys and the Airfield Survey Specification Document for the TAGGS Program may be downloaded from the following NGA website: **https://aero.geointel.nga.mil/products/taggs/index.cfm**.

2.18.3. Update survey requirements for the following calendar year using the TAGGS Priority Spreadsheet posted on the HQ AFFSA Airfield Operations website at **https://cs1.eis.af.mil/sites/AFFSA/A3A/SitePages/Home.aspx**. NLT 15 October annually. Updating this spreadsheet is mandatory for establishing priority and validating the need for geodetic surveys.

2.18.3.1. The MAJCOM TERPS function will coordinate with HQ AFFSA/A3A to adjust the survey schedule for their AOR, as required. For example; when proposed airfield construction projects conflict with the scheduled survey dates for a particular location.

**2.19. Master Obstruction Chart (MOC).** When establishing a new instrument procedure program at a location where the AF is responsible for development, publication, and maintenance of IFPs published in the DOD FLIP (Terminal), a MOC is mandatory. The MOC is used to assist in the identification of obstructions on or near the airfield that are not normally included in digital products (e.g., DVOF) used by GPD when no other source of airfield data (GEOBASE, geodetic airfield surveys, etc.) is available. **Note:** A MOC is not required when

only developing and using ATC charts at a location and no approach or departure procedures are developed or maintained by the AF.

2.19.1. Enter all identified obstacles, terrain points and vegetation into the GPD obstacle database unless it has been identified previously via digital ingestion (avoid duplicating previously accounted for obstacles). Document the locations and heights of the following items within the splays depicted on the MOC consistent with airfield geometry (runway/taxiway/ramp layout):

2.19.1.1. Man-made items (buildings, antennas, light poles, jet blast barriers, etc.).

2.19.1.2. Taxiing aircraft, parked aircraft, and aircraft parking spots. Add the aircraft tail height to the obstacle database with a 3-foot vertical accuracy at the appropriate location with a horizontal accuracy equal to at least the fuselage length of the type aircraft.

2.19.1.3. Terrain points. GPD utilizes digital terrain data from DTED, SRTM, obstacle data from NGA produced DVOF, and manually entered terrain and obstacle data. When using digital terrain data from DTED or SRTM in GPD, there is no requirement to manually search hard copy maps to identify terrain within the MOC. **Note:** The use of digital map products (CADRG, etc.) is authorized to validate obstacle data and terrain points only as the values on contour lines are not readable in most CADRG products. Ensure terrain lines and obstacles on the border of the trapezoids are considered during the manual map study. When available, use the appropriate scale paper map for each segment of the procedure as defined in Table 4.1.

2.19.1.4. Vegetation. GPD has the capability to add a vegetation allowance to the terrain model, however the increased MSL elevation for vegetation is not applied to DTED within 1.5 NM (2.8 kilometers) around each runway threshold, in precision final and all visual areas and in the departure ICA (as described in the GPD Operator's Manual, Volume III, paragraph 1.1.5.2.). Because the vegetation allowance is not applied in these areas, a manual search for vegetation for addition to the MOC is essential. When vegetation is present within the search area covered by the MOC, the location and elevation of this vegetation must be identified. **Note:** Vegetation outside the MOC must also be accounted for by adding it to procedure and chart properties or manually entering an obstacle (vegetation) with the required allowance.

2.19.1.4.1. In order to accurately account for trees, determine the maximum height of the tallest tree species indigenous to the area by contacting the State Forestry Division or host nation equivalent. When desired or necessary, instrument procedure designers may reduce the maximum tree height when a lower height can be verified by a qualified source or survey (i.e., Forestry Division confirms vegetated area does not include largest indigenous tree species, or qualified survey source determines actual tree height).

2.19.1.4.2. When electing to reduce the maximum tree height to a lower height, consider annual rate of growth and update the tree or vegetation height annually. Document the addition of the annual rate of growth in TERPS records.

2.19.2. Obstacle accuracies.

2.19.2.1. When no vertical accuracy value is applied to manually added obstacles, GPD will automatically add 125 feet to the top of the obstacle height entered. To prevent this automatic addition by GPD, manually input an accuracy value. For example, the appropriate authority has provided the maximum height of any tree in a given area as 90 feet. Add the trees as 89-foot AGL trees with a vertical accuracy of ± 1-foot; GPD will then evaluate 90 feet AGL trees.

2.19.2.2. When deriving data directly from paper map products, apply the appropriate horizontal and vertical accuracies from Table 8.4.

2.19.3. Forward unit developed MOCs to the responsible MAJCOM for review and approval. Once the obstacle data (vegetation, buildings, towers, terrain points, etc.) identified on the MOC is included in the GPD obstacle database and a copy of the completed, original MOC is saved either electronically or hard copy, follow-up maintenance or review of the MOC is not required.

2.19.4. Develop a MOC centered on the aerodrome reference point and extended to include the area within 1.5 NM (2.8 kilometers) around each runway threshold or to the perimeter of the airfield or to the extent of the CE maps or airport obstruction charts (OCs) whichever is greater. Topographical map equivalents may be used to support the obstacle search. **Note:** Digital GIS or Geobase Common Installation Picture (CIP) equivalents to “E-” and “C-” series CE maps may also be used for obstacle searches and MOCs.

2.19.5. When maps are not available for MOC development at contingency locations, create a GPD database containing the most current DAFIF, DVOF and digital terrain data covering each active workspace. Create a workspace (or workspaces) large enough to encompass an area at least 5 nautical miles (NM) beyond the area to be protected for the furthest segment or sector of any instrument procedure or chart developed using automation. Document the lack of map availability in each affected procedure package.

2.19.6. Construct a search area using Topographic charts (1:24,000, 1:25,000, 1:50,000, 1:62,500, or 1:100,000) and Civil Engineering (CE) maps as follows:

2.19.6.1. Draw a line originating from the ARP extending out to the map edge. Repeat the line every 5° until the entire map has been covered (360° – 72 lines).

2.19.6.2. Construct concentric circles, each centered on the ARP, in 0.25 NM intervals (0.25 NM, 0.50 NM, 0.75 NM, 1.0 NM, etc.) outward to the map edge. When the edge of the map extends beyond 10 NM, limit this search area to 10 NM from the ARP.

2.19.6.3. Each 5° by 0.25 NM splay area represents an area for obstacle search and identification. Identify the object (obstacle, terrain or vegetation) with the highest MSL elevation within each splay area. Objects with an MSL elevation below the lowest threshold elevation at the airport may be excluded.

2.19.7. When a vegetated (tree covered) area is identified within the obstacle identification splay, determine the location of the vegetation as the point closest to the edge of the runway and identify the obstruction as multiple trees.

2.19.8. Use adverse assumption when determining the most critical height of un-measurable objects (trees, power poles, power lines, etc.). When assumptions are made, document the source(s) used to determine the assumed values and retain in TERPS records. When

evaluating terrain around an above ground object to determine the MSL elevation of the object where only the AGL height of the object is reported, ensure hilltops and draws are considered; apply adverse assumption by using the 'one foot less than the next map contour line interval' technique. The following sub-paragraphs illustrate this technique. **Note:** Adverse assumption for vegetation shall be applied, as appropriate, when using DTED and map products. Printed or plotted NGA CADRG maps shall not be used in-lieu-of the appropriate scale paper map for manual evaluations.

2.19.8.1. Given the following: map contour interval is 20 feet; the highest contour line identified within the applicable map study area is 300 feet; the reported height of the object is 100 feet AGL; and the vertical accuracy associated with the object is 25 feet.

2.19.8.2. The MSL elevation value of the ground used to determine the MSL value of the obstacle would be 319 feet (320 – 1 = 319) in this example.

2.19.8.3. This value is then added to the reported AGL height of the object to derive the MSL elevation of the object (319 + 100 = 419). Any vertical accuracy value associated with the object must also be added to determine the final MSL value of the object for TERPS obstruction considerations.

2.19.8.4. Using the technique described above with the values provided, the object's final MSL height used to evaluate it for TERPS considerations would be 444 feet MSL (319 + 100 + 25 = 444).

**2.20. Obstruction Evaluation/Airport Airspace Analysis (OE/AAA).** The TERPS authority must assess the effect of construction proposals upon existing or proposed terminal area IFR operations (**paragraph** 1.14.5).

2.20.1. Obstacles may be ignored when means are established to control its height, location, or both. A construction crane or vehicular traffic on a perimeter road equipped with lights controlled by ATC are good examples. **Note:** Procedures for control of these types of obstacles must be outlined in a Local Operating Procedure.

2.20.2. Temporarily adding an obstruction to the GPD database for evaluation purposes is allowed. Do not amend any IFP or ATC chart based on the evaluation until it is determined actual construction has started.

# Chapter 3

## FOREIGN TERMINAL INSTRUMENT PROCEDURES (FTIP)

### *Section 3A—United States Air Force FTIP Acceptance Program*

**3.1. Program Overview.** IAW SECDEF policy, each service has the authority to establish a process that identifies, maintains, and periodically revalidates a list of nations and specific airports that meet instrument procedure criteria equivalent to US standards. The USAF FTIP Acceptance Program implements the SECDEF policy for the AF. This program provides relief from completing a full review of every host nation instrument procedure prior to being used. FTIP accepted under this program and published by the AF in the DOD FLIP (Terminal) are not subject to the instrument procedure waiver process (paragraph 2.5) for any deviation to accepted standards, i.e., US TERPS, ICAO PANS-OPS, or NATO Military Instrument Procedures Standardization (MIPS) as defined in Allied Air Traffic Control Publication-1 (AATCP-1).

3.1.1. Host nation programs, airports, and associated source data that have not been evaluated and those that do not meet the guidelines set forth in this chapter are categorized as "non-accredited". These programs and airports are not listed on the USAF Host Nation Acceptance List. When published in the DOD FLIP (Terminal), FTIP based on non-accredited host nation source require in-depth review and waiver for deviations to standards prior to publication in the DOD FLIP (Terminal).

3.1.2. Completion of the checklist at Attachment 5 (**paragraph** 3.2.4) by the MAJCOM TERPS function is required to assess the acceptability of each host nation program or airport. The reliability and accuracy of selected host nation flight inspection and instrument procedure development and publication practices are systematically evaluated prior to acceptance. Once accepted, host nation civilian airports and military or civilian instrument procedure programs are added to the USAF Host Nation Acceptance List.

3.1.3. The two categories for accepted host nation programs are "accredited" and "special accredited." Individual host nation airports are not eligible for the accredited category but may be evaluated for the special accredited category. The approval period for both categories (accredited and special accredited) expires three years from the date the approval is granted.

3.1.3.1. Host nation instrument procedure programs and airports may be categorized as special accredited only when the AF places a very high degree of confidence in the host's flight inspection practices, and IFP development and publication practices. These host nation programs are considered equal to DOD or FAA programs.

3.1.3.2. Host nation instrument procedure programs may be categorized as accredited only when the AF has confidence in the host's flight inspection practices, IFP development and publication practices. These host nation programs produce instrument procedures that require completion of the checklist at Attachment 6 when being reviewed for posting to GDSS in the Airfield Suitability and Restrictions Report (ASRR) and prior to publishing in the DOD FLIP (Terminal).

3.1.4. The responsible MAJCOM TERPS function shall only evaluate and submit candidate host nation programs and airports that are within their MAJCOM TERPS AOR (**paragraph** 1.6).

3.1.4.1. Evaluate each country's military and civilian instrument procedure development and publication process separately when each uses different methods, criteria, or standards, or when performed by separate offices.

3.1.4.2. Submit requests for initial accreditation, for program upgrade to the special accredited category, for special accreditation of individual airports, and revalidation via email to HQ AFFSA/A3A at **hqaffsa.a3a@tinker.af.mil** or via the TERPS helpdesk. Accreditation requests for multiple programs or airports in a single submission will not be accepted. Do not submit requests attached to (or part of) another document such as a trip report.

3.1.4.3. Ensure each FTIP acceptance request is approved and endorsed by the MAJCOM TERPS function OIC, Flight Commander (or higher), or a formally designated representative. Include a statement that indicates all requirements have been completed, a short summary of the review results, and any MAJCOM recommendation(s).

**3.2. Evaluation and Acceptance Requirements – Accredited Category.** In addition to the requirements in paragraph 3.1, the following requirements apply when submitting candidate instrument procedure programs for initial acceptance.

3.2.1. Inform HQ AFFSA/A3A as soon as practical (but not later than 30 days prior to submitting a candidate program) that a host nation instrument procedure program is being considered for accreditation purposes. Identify the country name and which program (civil, military, or both) is being considered.

3.2.2. Inform the applicable US Defense Attaché Office (USDAO) that a host nation instrument procedure program is being considered for addition to the USAF Host Nation Acceptance List. Request input from that office reference any concerns they have that may discourage acceptance of the candidate program.

3.2.3. Access information from the following documents (web sites not listed here are listed in Attachment 1) and review the indicated documents for data that supports the accreditation request and for potential concerns that may discourage acceptance of the candidate program:

3.2.3.1. FAA International Flight Information Manual;

3.2.3.2. FAA Notices To Airman-Domestic/International;

3.2.3.3. Foreign Facilities Approved for Category II/III Operations at **http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/afs400/afs410/status_lists**/.

3.2.4. Complete the checklist at Attachment 5 and provide supporting documentation used to answer each checklist item as follows:

3.2.4.1. Document all known and declared host civil or military exceptions to criteria (i.e., US TERPS, ICAO PANS-OPS, NATO AATCP-1) and flight inspection standards used by the candidate program when answering checklist Items 6 and 7. Normally, these exceptions are located in the host nation AIP. **Note:** Host nation exceptions are not

always declared in the host nation AIP or other host nation source documentation. When exceptions to standards are known to exist but are not documented in host source, attempt to validate them with host nation instrument procedure and aviation authorities.

3.2.4.2. A site visit is not required, however, when a site visit is conducted, include site visit results or a copy of the trip report, as applicable.

3.2.4.3. Except for checklist items 1 and 2, validate the answers to checklist items by including copies of host source, emails, or hard copy correspondence. When host source does not or cannot directly validate the response to a checklist item, provide other justification; providing only a checkmark in the appropriate column of the checklist will not be accepted.

3.2.4.4. Documentation shall include a historical listing of any obstacle clearance related discrepancies previously discovered as part of the FTIP review or publication process while the program was non-accredited. Provide rationale that explains how these discrepancies no longer affect safety of flight.

3.2.4.5. Include representative samples of host nation approach and departure procedures; do not submit the entire AIP. Further, submit the following sections from the current host nation AIP (or other host nation source that documents the same information):

3.2.4.5.1. GEN 1.7. Differences from ICAO Standards, Recommended Practices and Procedures.

3.2.4.5.2. GEN 2.1. Measuring System, Aircraft Markings, Holidays.

3.2.4.5.3. GEN 3.1. Aeronautical Information Services.

3.2.4.5.4. ENR 1.5. Holding, Approach and Departure Procedures.

**3.3. Evaluation and Acceptance Requirements – Special Accredited Category.** In addition to the requirements in paragraph 3.2, the following requirements apply when submitting a host nation's civil or military program or airport for the special accredited category.

3.3.1. The program shall have been categorized as "accredited" on the United States Air Force Host Nation Acceptance List for a minimum of 24 consecutive months.

3.3.2. The special accredited category will not be granted for an individual airport or for a specific instrument procedure program unless specific justification is provided when;

3.3.2.1. Host nation source documentation (AIP, FLIP data, NOTAMs, IFPs, etc.) is not published in easily understandable English;

3.3.2.2. Host nation departure procedures are not available from host source documentation for review. **Note:** Review AIP and FLIP products to determine whether or not departure procedures (either ODPs or SIDs), as defined in FAA Order 8260.46, *Departure Procedure (DP) Program*, have been established for obstacle avoidance;

3.3.3. FAA International Aviation Safety Assessment (IASA) Program. Review the results of the FAA International Aviation Safety Assessment (IASA) Program at **http://www.faa.gov/about/initiatives/iasa**/.

3.3.3.1. Although the IASA program does not currently review or apply specifically to host nation instrument procedure processes, the results indicate host nation oversight capability of their aviation safety program. Since this program assists each country meet its obligations under ICAO and provides oversight of each air carrier operating into the U.S., the AF will take advantage of these FAA efforts and consider IASA program results as a limited part of the special accreditation process for host nation civil programs only.

3.3.3.2. Civil instrument procedure programs in countries that are rated Category 2 (does not meet ICAO Standards) will be provided additional review by HQ AFFSA/A3A during the approval process on an "as needed" basis. When requesting special accreditation for programs rated Category 2, include justification endorsed at the MAJCOM 3-letter level (or above).

3.3.4. A site visit (not an inspection) by representatives from the MAJCOM TERPS function to the applicable (civil or military) host nation's procedure development office shall be conducted. Document the results of the site visit (a trip report format is acceptable) and forward to HQ AFFSA/A3A within 90 days of the site visit. **Note:** The purpose of this visit is to become more familiar with the host nation's IFP processes. To the maximum extent possible, review and document instrument procedure designer experience and training, flight inspection practices, procedure development standards, and IFP publication processes.

3.3.5. The request to special accredit an instrument procedure program shall include a statement indicating all requirements in paragraphs 3.2 and 3.3 have been met unless rationale is provided for submitting the program for special accredited category without meeting the requirement(s). HQ AFFSA/A3A will make the final decision based on the documentation and rationale provided.

**3.4. Evaluation and Acceptance Requirements – Host Nation Airports.** Individual host nation airports may only be considered for the special accredited category, regardless of the status (accredited or non-accredited) of the applicable host nation program responsible for IFP design and publication at the airport. Include the official airport name and the associated four-letter ICAO airport identification as indicated in host source in the request.

3.4.1. Requests for special accreditation of host nation airports shall normally meet all requirements as outlined in **paragraph** 3.3 except for those in **paragraphs** 3.3.1 and 3.3.3.

3.4.2. Conduct the site visit (**paragraph** 3.3.4) to the host nation aviation authority's office responsible for developing that airport's instrument approach and departure procedures.

3.4.3. The request shall state that all requirements in **paragraph** 3.4 have been met unless rationale is provided for submitting the airport for special accredited category without meeting the requirement(s). HQ AFFSA/A3A will make the final decision based on the documentation and rationale provided.

**3.5. HQ AFFSA/A3A Acceptance Approval Responsibilities.**

3.5.1. Solicit and consolidate comments from other MAJCOMs, NGA, the United States Army Aeronautical Services Agency (USAASA), the Naval Flight Information Group (NAVFIG), and from the FAA regarding the suitability of submitted programs or airports, as appropriate, based on the accreditation category being requested or revalidated and inform these agencies of completed FTIP acceptance actions.

3.5.1.1. Review and evaluate the documentation provided by the responsible MAJCOM and the results of the inquiries to outside agencies. This includes requests for initial accreditation of candidate programs and airports and all subsequent revalidation packages for accepted programs and airports. The review will be completed within 30 days depending on the completeness of the MAJCOM's submission and the responsiveness of the outside agencies.

3.5.1.2. Provide feedback to the responsible MAJCOM when comments from outside agencies reflect negatively on the MAJCOM's request. **Note:** The MAJCOM should attempt to resolve these issues with the host nation or the commenting agency, as necessary, to continue the accreditation process.

3.5.2. Maintain and distribute the United States Air Force Host Nation Acceptance List whenever updates are made to the list.

3.5.3. Notify the appropriate MAJCOM TERPS function of changes to the status of approved host nation instrument procedure programs.

**3.6. Maintaining FTIP Acceptance Approval.** The responsible MAJCOM TERPS function shall periodically revalidate accepted programs and airports. Submit revalidation packages to HQ AFFSA/A3A at any time during the approval period but NLT 30 days prior to the accreditation expiration date; include all documentation required in **paragraphs** 3.2, 3.3, and 3.4, as applicable. When required, forward revalidation extension requests to HQ AFFSA/A3A at least 30 days prior to the accreditation expiration date; include rationale for the extension and the amount of additional time required.

3.6.1. Accredited Category. Include a recommendation for the program to either retain the current status, or for it to be upgraded or downgraded, as applicable. Failure to conduct the revalidation will result in status downgrade and removal from the USAF Host Nation Acceptance List without an approved request for extension.

3.6.2. Special Accredited Category. Include a recommendation for the program or airport to either retain the current status or for it to be downgraded, as applicable. Failure to conduct and document the revalidation site visit will result in removal of special accredited airports from the USAF Host Nation Acceptance List and downgrade of special accredited programs to the accredited category without an approved request for extension. Airports will remain non-accredited and programs will remain accredited until revalidation requirements are completed. Programs downgraded to the accredited category may retain this status for only 12 months before being removed from the acceptance list unless revalidation is accomplished.

3.6.3. Monitor the FAA IASA Program for changes to a country's IASA rating.

3.6.3.1. When a host nation's civil program is categorized as special accredited and the country no longer meets ICAO standards IAW the IASA Program, the responsible MAJCOM shall notify HQ AFFSA/A3A and recommend either downgrading the program or keeping the program in the special accredited category.

3.6.3.2. Adequate justification endorsed at the MAJCOM 3-letter level or above is required to keep the program special accredited. HQ AFFSA/A3A will review the documentation submitted and respond within 5 working days.

3.6.4. After a host nation's program or airport is accepted and the MAJCOM becomes aware of a condition or identifies a trend that would have precluded the initial approval of either category (accredited or special accredited), the responsible MAJCOM shall take the following actions:

3.6.4.1. Special accredited category airports and programs.

3.6.4.1.1. Notify HQ AFFSA/A3A of the new trend(s), condition(s), or change(s) to the host nation program and make one of the following recommendations: to maintain the special accredited category; to downgrade a program to the accredited category; or to downgrade an airport to the non-accredited category (i.e. remove the airport from the acceptance list). Final action will be based on the HQ AFFSA/A3A evaluation of the MAJCOM recommendation.

3.6.4.1.2. When a special accredited program is downgraded to accredited category, ensure the checklist at Attachment 6 is completed for all affected instrument procedures and that any required procedural changes are sent to NGA via a TAS letter.

3.6.4.1.3. When a special accredited airport is downgraded, the airport reverts to the non-accredited category.

3.6.4.1.3.1. NOTAM all affected instrument procedures "NOT AUTHORIZED" until the appropriate review is completed.

3.6.4.1.3.2. Unless the instrument procedure authority for the airport is categorized as accredited (e.g., Mexico civil), pursue all required waiver actions on all affected instrument procedures now based on non-accredited host nation source.

3.6.4.2. Accredited category programs.

3.6.4.2.1. Notify HQ AFFSA/A3A of the new trend(s), condition(s) or change(s) to the host nation program and make one of the following recommendations; to maintain the current status or to downgrade the program to the non-accredited category. Final action will be based on the HQ AFFSA/A3A evaluation of the MAJCOM recommendation.

3.6.4.2.2. NOTAM all instrument procedures downgraded to non-accredited as "NOT AUTHORIZED".

3.6.4.2.3. Perform a complete TERPS review IAW Figure 3.1 based on a downgrade on all affected instrument procedures.

3.6.4.2.4. Pursue all required waiver actions on all affected instrument procedures now based on non-accredited host nation source.

***Section 3B—General FTIP Requirements***

**3.7. Reviewing or Publishing Foreign Standard Terminal Arrivals (STARs).** Validate the following items on foreign STARs to the maximum extent possible according to the accreditation category of the host nation program that publishes the STAR. When able,

reproduce host nation STARs based on non-accredited source using GPD to assist in the validation process.

3.7.1. Special accredited category. When requested, provide a comparison review (**paragraph** 3.19) to the host nation STAR.

3.7.2. Accredited category.

3.7.2.1. Ensure the STAR commences at a charted high or low altitude en route fix.

3.7.2.2. Ensure the STAR terminates at a feeder fix, initial approach fix, or another appropriate fix.

3.7.3. Non-accredited host nation source. Validate the items in **paragraph** 3.7.2 and the following.

3.7.3.1. Verify altitudes provide obstruction clearance and that Special Use Airspace is not violated.

3.7.3.2. Verify the accuracy of courses, distances, and coordinates.

**3.8. Approach Minima Validation.**

3.8.1. When evaluating FTIP for TERPS review or when processing FTIP for publication, determine the units of measurement used by the host in their published instrument procedures for ceiling, runway visual range (RVR), and prevailing visibility (PV). The same units of measurement used by the host must be used in the DOD FLIP (Terminal) product and/or documented in the TERPS review.

3.8.2. When required, compute or validate FTIP ceiling and visibility minima IAW FAA Order 8260.3. Compare results with the host's published value(s) and publish the higher of the two. Adjust visibility minima upward when necessary to comply with reportable weather values IAW Attachment 2. **Note:** Changes made to FTIP minima due to rounding or adjusting upward to meet reportable values do not require coordination with the host nation.

3.8.3. For FTIP based on accredited and special accredited host nation source, evaluation of the visual portion of the final approach segment is at the discretion of the MAJCOM. **Note:** When this evaluation is accomplished, apply **paragraph** A3.23 and if a penetration of the 20:1 OIS is found, notify host nation instrument procedure authorities.

3.8.4. Apply **paragraph** 3.8.2 and reproduce accredited and special accredited radar minima data as published by the host in the DOD FLIP (Terminal) or in the TERPS review; neither GPD or the Attachment 6 checklist is required when reviewing or publishing radar minima from an accredited or special accredited source. **Note:** Review or publication of radar minima is at the discretion of the MAJCOM.

**3.9. Departure Procedure Validation.**

3.9.1. When host nation obstacle avoidance departure procedures have been established or when the host has published one or more SIDs, evaluate the host product(s) IAW this chapter for review or publication. When departure information is not evident in host nation documentation, close coordination with host aviation authorities may be required to determine their method of accommodating departures.

3.9.2. When unable to verify or validate host nation departure procedure practices (SIDs, Omni-directional departures, diverse departure information, etc.) and an AF developed method of departure is required to support the mission, apply the following:

3.9.2.1. Develop an appropriate workspace and accomplish a diverse departure (i.e., omni-directional departure) obstacle assessment IAW Chapter 5 regardless of the location's accreditation category.

3.9.2.2. Apply **paragraph** 3.25 and advise the host nation when obstacles penetrate the 40:1 OCS and establish a departure procedure package.

3.9.2.3. When the diverse departure (i.e., omni-directional departure) obstacle assessment identifies any obstacle that requires a climb gradient to an altitude greater than 200 feet above the DER, comply with **paragraph** 3.9.2.2 *and* either:

3.9.2.3.1. Determine the minimum climb gradient to a specified altitude that will provide the required obstacle clearance. Example: "**Minimum climb of 230 feet per NM to 4600"**, or

3.9.2.3.2. When an ODP routing permits a climb within a sector, define the courses to remain within in a clockwise (CW) fashion; e.g.,: "**RWY 12 – Climb on a heading between 061° CW to 228° from departure end of runway**."

3.9.2.3.3. Combining the options described in **paragraphs** 3.9.2.3.1 and 3.9.2.3.2 is also authorized. Example: "**Minimum climb of 350 feet per NM to 9300, climb on a heading between 061° CW to 228° from departure end of runway, or minimum climb of 260 feet per NM to 8700 for all other courses**."

3.9.3. MAJCOMs shall establish documentation requirements for host nation departure procedures developed with manual methods in a supplement to this AFI. Document departure procedures designed with GPD by completing AF IMT 4342, *Approach/Departure Signature Page*. MAJCOMs shall establish approving authority signature requirements for these FTIP.

**3.10. Metric Minima, Rounding, and Associated Conversions.**

3.10.1. Climb Gradients/Climb Rates/Vertical Velocity. Host nation departure and missed approach climb gradients are normally expressed as a percentage. Host nation climb gradients of 3.3% shall be considered equal to the standard climb rate for fixed wing aircraft of 200 ft/NM. When the published host nation climb gradient exceeds 3.3%, convert the climb gradient percentage to a foot per nautical mile (ft/NM) value. Determine the vertical velocity IAW **paragraph** 1.16.7 and ensure the appropriate values are published.

3.10.1.1. Multiply the host published percentage by 6076.11548. The result is the raw ft/NM value; round this raw ft/NM value up to the next whole foot value. The resulting value is the host percentage climb gradient expressed in ft/NM.

3.10.1.2. Example. Convert 5.4% into a climb gradient expressed in ft/NM as follows: .054 × 6076.11548 = 328.1102359. This result is rounded up to 329. Use 329 to determine the appropriate V/V values.

3.10.2. Descent Gradients. Convert host nation final approach descent gradients expressed as a percentage to a descent angle expressed in degrees. Round appropriately and publish the descent angle to the nearest 100th degree.

3.10.3. Descent Angle. Calculate and publish the descent angle IAW FAA Order 8260.3, Volume 1, paragraph 252, and as supplemented by **paragraph** A3.24.

3.10.4. Rounding altitudes and climb gradients is acceptable when converting from meters to feet or when converting host nation climb gradients expressed as a percentage to a ft/NM value.

3.10.4.1. Round minimum altitudes UP to the NEXT, maximum altitudes DOWN to the NEXT, and mandatory altitudes to the NEAREST:

3.10.4.1.1. Enroute - 1000-foot increment; altitude or flight level.

3.10.4.1.2. Departure procedures, Feeder, Initial, Intermediate, and Missed Approach segments – 100-foot increment.

3.10.4.1.2.1. Clearance limit altitudes specified in departure procedures and missed approach instructions shall be rounded to nearest 100-foot increment. Other altitudes used in the departure and missed approach should also use 100-foot increments.

3.10.4.1.2.2. When the 100-foot increment causes missed approach and departure procedure construction difficulties or changes the intent of the host developed procedure, use of 50-foot, 20-foot, or 10-foot increments is authorized. **Note:** These smaller increments are not programmed into GPD for missed approaches and will require manual missed approach evaluation or construction methods.

3.10.4.1.3. Final Approach Fix (FAF), stepdown fix, MDA - 20-foot increment. **Note:** ICAO/NATO MDA – 10-foot increment.

3.10.4.1.4. DH – 1-foot increment.

3.10.4.2. In all instances of rounding, ensure the rounded result does not violate the ROC of any segment or chart.

3.10.5. A pressure type altimeter calibrated in accordance with the Standard Atmosphere will indicate altitude above MSL when set to a QNH altimeter setting and height above the QFE reference datum when set to a QFE altimeter setting. Depict host nation published QFE heights in parentheses below the associated QNH altitudes in the DOD published FTIP. **Note:** Refer to AFMAN 11-217, Volume 1, Chapter 15, for additional information.

3.10.5.1. The QFE reference datum is normally indicated on each FTIP and will usually be one of the following: the runway threshold elevation; the runway touchdown zone elevation; or the airfield elevation.

3.10.5.2. The difference between the QNH value and the QFE value should equal the host published field elevation. When the applicable threshold elevation is more that 2 meters (7 feet) lower than the field elevation, the difference between the QNH value and the QFE value should equal the threshold elevation.

3.10.5.3. When the host nation publishes MSL altitudes in meters, convert and round host nation meter MSL values to a value expressed in feet MSL prior to publication in the DOD FLIP (Terminal).

3.10.6. Metric Altitude Conversions. Apply Table A4.3 when converting metric values. Do not directly convert metric QFE values to an equivalent MSL value and then round that value prior to publishing in the DOD FLIP (Terminal). When required, derive the equivalent MSL foot value of the host QFE value as follows:

3.10.6.1. Example 1: The reference datum is the field elevation of 34 feet (threshold elevation 30 feet). Host publishes a QFE value of 750 meters at the stepdown fix. Do not simply divide 750 meters by 0.3048 (750 ÷ 0.3048 = 2460.629921) and publish 2461 in parentheses. First add the reference datum elevation to the converted value (34 + 2461 = 2495) to determine the equivalent MSL value. Next, round that result (2495) up to the next 10-foot increment (2500) IAW **paragraph** 3.10.4.1.3. Next, subtract out the reference datum elevation from the rounded value (2500 – 34 = 2466). Publish 2500 (US QNH) over 2466 (US QFE) in parentheses at the stepdown fix on the DOD procedure.

3.10.6.2. Example 2: The reference datum is the threshold elevation of 616 feet (field elevation 625). Host publishes a QFE value of 750 meters at the final approach fix. Do not simply divide 750 meters by 0.3048 (750 ÷ 0.3048 = 2460.629921) and publish 2461 in parentheses. First add the reference datum elevation to the converted value (616 + 2461 = 3077) to determine the equivalent MSL value. Next, round that result (3077) up to the next 10-foot increment (3080) IAW paragraph 3.10.4.1.3. Next, subtract out the reference datum elevation from the rounded value (3080 – 616 = 2464). Publish 3080 (US QNH) over 2464 (US QFE) in parentheses at the final approach fix on the DOD procedure.

**3.11. Departure End of Runway (DER) Crossing Restrictions (screen height).** Apply **paragraph** 5.3.14. The standard ICAO OIS for straight departures begins at the DER at a height of 5 meters (16 feet). Evaluate host source for nonstandard DER crossing restrictions (screen heights) for either publication or for a TERPS review; take the following additional actions:

3.11.1. Use 16 feet above DER as the 40:1 OCS origin height when calculating the climb gradient unless the host source documents another height as the procedure design gradient starting point.

3.11.2. Do not approve a screen height lower than published by the host without first obtaining approval from the appropriate host nation aviation officials.

3.11.3. Do not establish DER crossing restrictions or publish a climb gradient (**paragraph** 5.3.1) solely to avoid any obstacle(s) identified at the host location as a low, close-in obstacle.

3.11.4. TAS letters to NGA shall include a request to chart host nation screen heights. Incorporate all DER crossing restriction instructions in the IFR takeoff minimums or in the departure route description, as applicable, describing the Above Ground Level (AGL) and MSL restriction in the following format: "**Cross DER at or above 20′ AGL/187′ MSL**" or "**Cross DER at or above 16′ AGL/3685′ MSL**".

**3.12. Maximum Holding Altitude Determination.**

3.12.1. When evaluating holding patterns based on non-accredited host nation source and the maximum holding altitude cannot be determined, evaluate the holding pattern to an altitude equal to an ESA or 10,000 feet above the host nation published minimum holding altitude (or the published IAF altitude), whichever is greater.

3.12.1.1. When this evaluation indicates a required change to the holding pattern as depicted on the FTIP, either lower the selected maximum holding altitude or select a smaller holding pattern (lower airspeed) and re-evaluate.

3.12.1.2. Continue this process until the selected altitude, the lower airspeed, or a combination of both allows use of the holding pattern as depicted on the FTIP. Publish the validated maximum holding altitude (and airspeed when required) on the DOD FLIP (Terminal). **Note:** Only publish the maximum holding altitude when required to ensure separation from obstacles.

3.12.2. A maximum holding altitude determination is not required for FTIP holding patterns based on accredited or special accredited host nation source.

**3.13. Foreign Facilities Approved for Category II and Category III Operations.** Host nation CAT II/III ILS procedures approved by the FAA are posted on the FAA AFS-410, Flight Operations Branch, web site (**paragraph** 3.2.3.3). These FTIP are evaluated individually therefore the FAA approval does not apply to any other procedures or to the ILS equipment associated with that runway.

3.13.1. At MAJCOM discretion, CAT II/III ILS FTIP that have been approved by the FAA on the FAA AFS-410 web site may be reviewed or published under the guidelines established in this AFI for instrument procedures based on special accredited host nation source regardless of the accredited category of the host nation instrument procedure authority.

3.13.2. CAT II/III ILS FTIP not on the FAA AFS-410 web site are subject to the review or publication requirements associated with FTIP based on the accredited category of the host nation instrument procedure authority, as applicable.

3.13.3. Do not combine host nation CAT I ILS procedures with host nation CAT II/III ILS or any other instrument procedure. When the host nation combines CAT I/II/III ILS procedures on a single plate, de-combine the CAT I ILS procedure from the CAT II/III ILS procedures and publish the host nation CAT I ILS separately in the DOD FLIP (Terminal).

**3.14. FTIP Procedure Turns.** Chart procedure turns exactly as shown on the FTIP. Include the fix when the turn starts at a fix, rather than at a time or distance determined by the pilot. Determine and publish the outbound and inbound tracks on the 45° offset of the 45°/180° procedure turn (PT) when they are not shown on the FTIP.

3.14.1. When a “Remain within Distance” is not published by the host nation, coordinate with the host nation instrument procedure authority to determine the intended “Remain within Distance” for the PT and publish that value in the DOD FLIP (Terminal). Publish an appropriate note in the profile view when unable to determine this distance; e.g., “**CAUTION: Remain within dist unknown**”.

3.14.2. Determine and publish all appropriate notes and operational information necessary to convey the intent of the course reversal maneuver.

**3.15. FTIP Master Obstruction Chart (MOC) Requirements.**

3.15.1. Develop a MOC IAW paragraph 2.19 when the AF has requested and obtained approval from host nation aviation authorities to develop and maintain one or more IFPs at a non-accredited location and the IFP(s) will be published in the DOD FLIP (Terminal). A MOC is not required at any host nation location where the AF only reviews or publishes FTIP.

3.15.2. Search for applicable obstacle data to support MOC development in the host nation AIP and include this data in the GPD obstacle database. Perform a map study of the host nation location and add any additional obstacle (trees, buildings, towers, smokestacks, etc.) data into the GPD database. **Note:** Manually developed IFPs and manually developed IFP segments also require a map study that includes all segments of the IFP, to include holding patterns, holding pattern buffer areas and each initial approach fix area for man-made obstacles, terrain and vegetation.

**3.16. Translating FTIP Not Published in English.** FTIP published by the host nation in any language other than English require a complete translation prior to publication in the DOD FLIP (Terminal) and prior to being reviewed for posting to GDSS in the ASRR.

3.16.1. The only approved sources for translating information and instrument procedures obtained from a foreign AIP are NGA, a qualified translator on the MAJCOM TERPS staff, or the USDAO located in the country where the instrument procedure is located.

3.16.2. Send requests for copies or translation of host nation source documentation to the NGA Terminals Procedures Branch at: **Host_Source@nga.mil.** The subject line of the email should include the country name, airfield name, due (D) date, mission (M) date and the priority code per **paragraphs** 3.16.2.1 and 3.16.2.2; this will ensure proper distribution at NGA and a timely response. Also include the purpose (either FTIP review or publication) for the translation.

3.16.2.1. Priority Codes. P1 = 1-3 Business Days; P2 = 3-6 Business Days; P3 = 7-14 Calendar Days; P4 = 15-30 Calendar Days.

3.16.2.2. Example 1: Kyrgyzstan, Bishkek, D5/13/12, M5/30/12, P2. Example 2: Columbia, Multiple Airfields, D5/13/12, M5/20/12, P1.

**3.17. FTIP Flyability Check Requirements.** FTIP based on accredited or special accredited host nation source do not require any type of flyability check. FTIP based on non-accredited host nation source require an actual (live) flyability check, flown IAW **paragraph** 4.1, prior to initial publication in the DOD FLIP (Terminal) unless one of the conditions in **paragraph** 3.17.1 or in **paragraph** 3.17.2 is met.

3.17.1. A Title 14, *Code of Federal Regulations*, PART 121, *Operating Requirements: Domestic, Flag, and Supplemental Operations*, air carrier routinely serves the location.

3.17.1.1. Contact the US air carrier to determine if special restrictions have been established for operating at this airport. Document the results of this inquiry in the procedure package.

3.17.1.2. When the air carrier has established restrictions, obtain and evaluate these restrictions to determine whether or not they should be applied to the DOD procedure. **Note:** FAA Order 8260.31, *Foreign Terminal Instrument Procedures*, requires air

carriers to provide this information to the AF. When the air carrier does not respond or refuses to divulge information, contact HQ AFFSA/A3A for assistance. When publication of the procedure is required prior to resolution by HQ AFFSA/A3A, a flyability check is required.

3.17.2. The FAA has flight inspected the instrument procedure.

3.17.2.1. A copy of this flight inspection report will be considered an acceptable substitute for AF IMT 3992 or AF IMT 3993 and shall be maintained with the instrument procedure package.

3.17.2.2. The flight inspection report must specifically state "**SIAP verified IAW Order 8200.1, USSFIM, Chapter 6**" or the "SIAP Verified" block must be checked. Rationale: there are locations where only the NAVAID is inspected IAW FAA Order VN 8200.3A, *Policy with Respect to Military Program Procedures for Flight Inspection of Foreign-owned Air Navigation Facilities* and not the associated instrument procedure(s).

3.17.3. When one of the conditions in paragraph 3.17.1 or 3.17.2 exists and a live flyability check is not completed, a flight simulator or tabletop review is required prior to initial publication in the DOD FLIP (Terminal). Document completion of this review on AF IMT 3992, *Instrument Procedure Flyability Check Instrument Approach Procedure (IAP)* or AF IMT 3993, *Instrument Procedure Flyability Check Departure Procedure (DP)*, as appropriate, and retain the signed IMT in the procedure package. When either the "simulator" or "tabletop reviews only" block is checked, explain in the comments block why this option was used. Example: "**Tabletop review conducted due to airport having routine 14 CFR PART 121 air carrier operations.**"

3.17.4. Revisions to FTIP published in the DOD FLIP (Terminal) do not require flyability checks, tabletop, or simulator reviews.

**3.18. FTIP Flight Inspection Requirements.** Flight inspection of FTIP is required prior to the initial publication in the DOD FLIP (Terminal). Revisions made to FTIP after initial publication in the DOD FLIP (Terminal) do not require flight inspection.

3.18.1. Flight inspection may be performed by the FAA or by an ICAO certified or approved host government or private flight inspection authority. Flight inspections conducted by a host nation government or private flight inspection authority are acceptable as long as the host nation indicates that the flight inspection authority adheres to standards in FAA Order 8200.1 or ICAO Annex 10.

3.18.2. When the MAJCOM has been given the authority to develop and publish IFPs at a host nation location, flight inspection is required prior to the initial publication in the DOD FLIP (Terminal). Apply **paragraph** 1.14.4.2, as required.

***Section 3C—FTIP Review (Figure 3.1)***

**3.19. Non-US Government Published FTIP.** When FTIP are not published by the US government, an FTIP review must be accomplished before the host procedure can be flown. There are two types of FTIP reviews; TERPS review and comparison review. TERPS review is conducted on the host nation produced instrument procedure; it validates host nation compliance with the appropriate instrument procedure criteria or standard. Comparison review is conducted

between the host nation produced instrument procedure (the FTIP) and the corresponding commercially produced instrument procedure. This review only validates the reproduction accuracy provided by the commercial vendor (e.g., Jeppesen®, Lufthansa, etc.), i.e., the comparison review does not evaluate compliance with instrument procedure criteria or standards.

3.19.1. MAJCOMs will only perform reviews at locations within their established TERPS AOR (paragraph 1.6). Prior to beginning a review, the HQ AMC Global Decision Support System (GDSS) Airfield Suitability and Restrictions Report (ASRR) should be checked to determine whether or not a review has already been accomplished. Submit reviews approved by the MAJCOM flying operations authority to HQ AMC for posting to the GDSS IAW the HQ AMC MOU, subject: **Disseminating Foreign Terminal Instrument Procedures (FTIPs) Information via AMC Global Decision Support System (GDSS)** at: **https://gdssams.maf.ustranscom.mil/gdss2web**/

3.19.2. Where a command has no "in-house" TERPS function (e.g., USAFCENT), or when the review responsibility is delegated to another MAJCOM (i.e., the reviewing MAJCOM), the ORM decision(s) and final approval to use the FTIP shall be made by the flying operations authority of the MAJCOM requesting the review (i.e., the requesting MAJCOM), or by the command authority exercising operational control of the mission aircraft. The requesting MAJCOM shall determine the office in which this authority is vested.

3.19.3. The original review and approval restrictions are made by the reviewing MAJCOM and posted on the GDSS ASRR; all restrictions apply to all AF users of the reviewed FTIP. Specific conditions for a given aircraft category may be identified in the review; restrictions not identified for a specific aircraft category shall apply to all aircraft categories. Additional FTIP review may be performed by another MAJCOM after the original review has been posted to GDSS ASRR. When this reviewing command determines supplemental guidance is necessary, they may append command specific restrictions to the original review that only apply to aircrews under their operational control.

3.19.4. The review may be waived when the procedure is required for nonstandard operations defined as an urgent requirement to fly short-notice, humanitarian, contingency, medical evacuation (MEDEVAC), "special" access and urgent State Department missions.

3.19.5. The requester is responsible for identifying all FTIP and commercially produced products requiring review. Establish guidance for FTIP review requests to be directed to the MAJCOM TERPS function. Guidance should include the following:

3.19.5.1. An amount of lead time sufficient to ensure review requests are completed before the mission start date. Requests for a single approach or departure should be provided to the reviewing MAJCOM at least seven duty days prior to the mission date; additional notice would be required when multiple FTIP reviews are requested.

3.19.5.2. The following minimum review request content:

3.19.5.2.1. The applicable four-letter ICAO location identifier(s);

3.19.5.2.2. The airport name(s);

3.19.5.2.3. Mission start and termination dates;

3.19.5.2.4. The aircraft category and aircraft instrument capability (e.g., NDB, VOR, TACAN, GPS, etc.);

3.19.5.2.5. The specific name of each FTIP required.

3.19.6. Obtain copies of the applicable host nation's AIP or terminal FLIP products from NGA. These products are available from the Aeronautical Source Packaging System (ASPS) at: **http://149.8.167.106**/. **Note:** An account and password is required to access this system. Do not download host nation instrument procedures from foreign internet web sites.

3.19.7. When the FTIP review is complete, endorsement of the acceptability of the instrument procedure by the MAJCOM Stan/Eval (or MAJCOM determined equivalent) function is required. FTIP reviews must include recommendations or limitations from Stan/Eval concerning the procedure.

3.19.8. Document reviews IAW the memorandum format outlined in Attachment 1 of the HQ AMC MOU. The review memorandum shall state which segments, if any, were found not to meet criteria or standards. Include appropriate comments when the FTIP does not meet recognized obstruction clearance or when flight inspection abnormalities are known to exist. In conjunction with the MAJCOM Stan/Eval, determine what action (normally an operational or caution note) is necessary, if any, to allow the user to compensate for each deviation. MAJCOMs shall establish FTIP review package content requirements. Record approval and disapproval actions and retain the TERPS review with supporting documentation, as applicable, in a procedure package.

3.19.8.1. HQ AMC/A3AT shall post reviews as received, verbatim, from the reviewing MAJCOM (OPR). Any change(s) to the review made by HQ AMC/A3AT shall be approved by the OPR prior to the review being posted. When information in GDSS already contains the same information included in the completed review, the duplicated information may be excluded from the OPR version of the review posted to the GDSS.

3.19.8.2. The reviewing MAJCOM shall be responsible for informing the requesting agency when changes to a review are required. Do not amend a review by NOTAM; send revisions to HQ AMC/A3AT for posting to the GDSS.

3.19.8.3. Each review posted to the GDSS shall have an expiration date clearly indicated in the review. Reviewed FTIP will receive continuous maintenance IAW **paragraph** 2.12.3 while the review remains effective. **Note:** When publication of the reviewed FTIP is desired, the review expiration date should match the anticipated publication date in the appropriate FLIP.

3.19.8.3.1. When maintenance of the FTIP has been stopped for any reason, and a new request for review of the FTIP is received, the review must be re-accomplished with a new expiration date.

3.19.8.3.2. When subsequent requests for a review are made and maintenance has been continuous, the FTIP does not have to be reviewed again. For example, when the FTIP will be required for an extended period of time or is awaiting publication and request(s) are received for the review to be used before the review expires, the process does not have to be reinitiated; the current review may be used to satisfy the new request.

3.19.8.3.3. When the requested FTIP is in the TERPS AOR of another MAJCOM (**paragraph** 1.6), the reviewing MAJCOM retains maintenance responsibility until the operation or exercise expires or until maintenance responsibility is transferred.

3.19.8.4. When more than six reviews are required on a particular FTIP over a 12-month period, the responsible MAJCOM TERPS function should take steps to publish the required FTIP from that location in the DOD FLIP (Terminal).

**3.20. Conducting TERPS Review.** IAW Figure 3.1 and this chapter, review host nation produced IFPs with US TERPS criteria. When the reviewing MAJCOM has personnel assigned that have completed PANS-OPS training, reviews may be conducted using ICAO standards by the trained individuals.

3.20.1. Except for PAR and ASR approaches and as indicated in **paragraph** 3.20.2, all FTIP must have a complete TERPS review of all segments; include associated holding patterns, landing minima, and minimum sector altitudes. Host nation airway structure does not require evaluation. When unable to perform a complete evaluation of a segment using GPD, or when GPD does not support the type procedure, review the remainder of the segment or the procedure manually.

3.20.1.1. Evaluate the required host nation departure procedure(s) IAW **paragraph** 3.9. Add the results of the diverse departure obstacle assessment to the review. When the assessment does not identify any OCS penetrations, add the following note to the review: "**No obstacles found that require a climb gradient in excess of 200 feet per NM."**

3.20.1.2. Also note in the review of the departure: "**Rwy XX, Use** (NAME of host DP/SID) **for Obstacle Avoidance/ATC climb rate/noise abatement** (as applicable)."

3.20.2. TERPS review of special accredited FTIP (civil or military) is not required, however, the MAJCOM TERPS function may establish TERPS review requirements for this FTIP category at their discretion. When requested, provide ceiling and visibility based on the host published minimum descent altitude/height (MDA/H) or decision altitude/height (DA/H), as applicable.

3.20.3. TERPS review of accredited FTIP. Use of the FTIP REVIEW and PUBLICATION CHECKLIST at Attachment 6 is required. Use of GPD software when conducting the TERPS review in conjunction with this checklist is optional.

3.20.3.1. Complete, sign, and date the Attachment 6 checklist after completing the review.

3.20.3.2. Evaluation of obstacles for ROC is not required except as noted in **paragraph** 3.9.2.

3.20.3.3. Add the results of the Attachment 6 checklist to the TERPS review.

3.20.4. TERPS review of non-accredited FTIP. Evaluate obstacles for ROC in each segment of the instrument procedure. Use GPD to the maximum extent possible when conducting the TERPS review.

3.20.4.1. Manually evaluate any segment(s) that GPD does not support for obstacle clearance via map study and report the results in the review. Indicate in the TERPS

review when deviating from map scale requirements established in Table 4.1; include the map scale required and the map scale used.

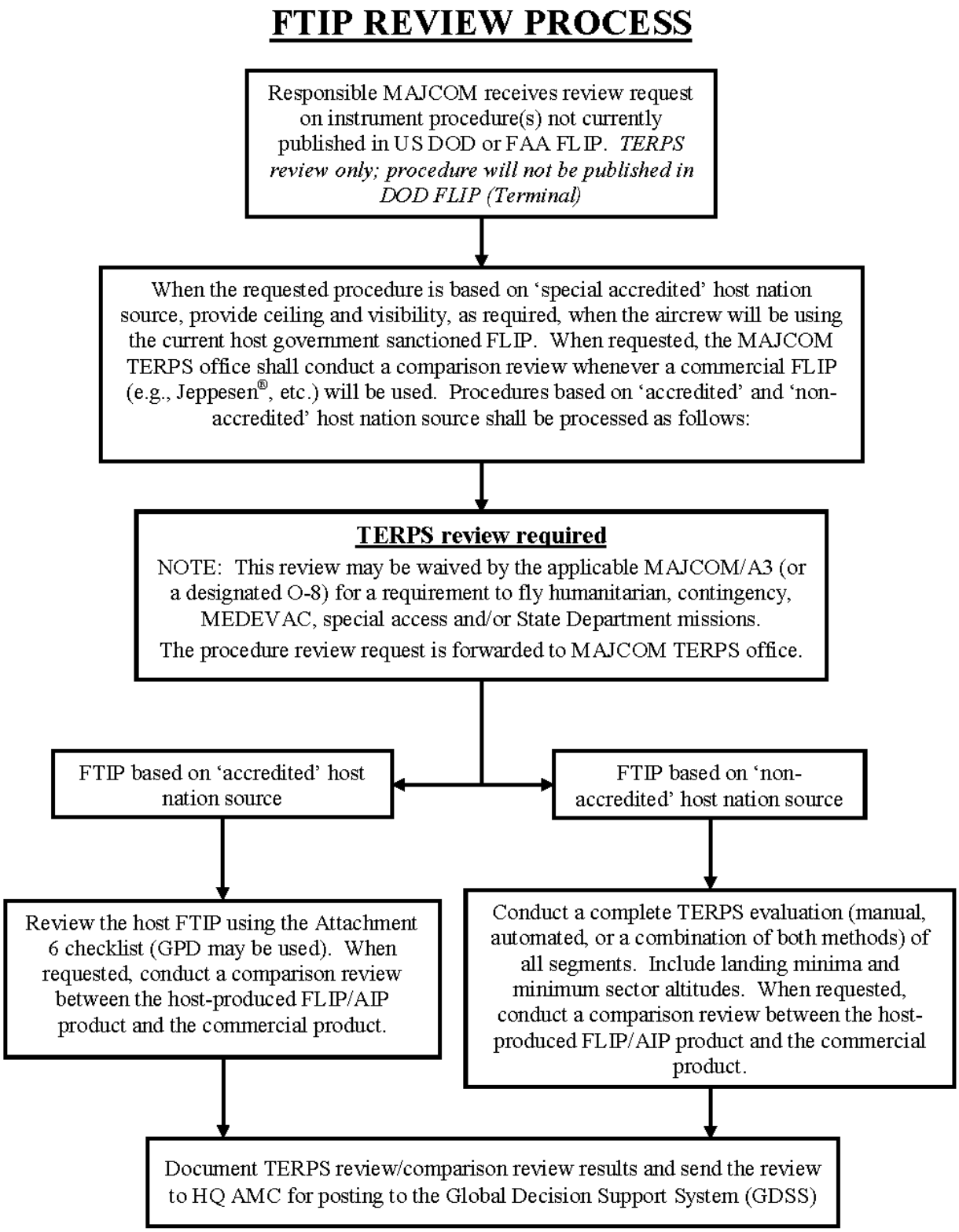
3.20.4.1.1. When the appropriate scale paper map products outlined in Table 4.1 do not exist or are not available for the map study, and when digital terrain data is not available, ensure the procedure is restricted to "**DAY VMC"**. A live flyability check is required prior to the reviewed FTIP being used under IMC.

3.20.4.1.2. Ensure all segments that have not been evaluated using the appropriate scale paper product or with digital terrain data are assessed during the flyability check. Conversely, when a 1:500,000-scale map (or a scale with better resolution) was used to evaluate the holding pattern, it would not be necessary to have the holding pattern evaluated.

3.20.4.2. Retain the TERPS review in a procedure package with the GPD build report until the review expires.

**3.21. Conducting Comparison Review.** When requested, conduct a comparison review to determine how accurately the commercial vendor reproduced all of the information and graphics published by the host nation. Compare each item on the commercial product with the corresponding item on the host nation product. When this review reveals charted differences between the commercial product and the host nation product, ensure the differences are annotated in the memorandum. When the reviewing MAJCOM does not have access to the requested commercially produced product or when current copies are not readily available from NGA or from the vendor, inform the requesting agency that a comparison review cannot be accomplished.

**Figure 3.1. Basic Process for Reviewing FTIP.**



***Section 3D—Publishing FTIP in the DOD FLIP (Terminal) (Figure 3.2)***

**3.22. Selection.** Requests for publication of FTIP in the DOD FLIP (Terminal) should specify the required instrument procedure(s) by name and location. Obtain copies of the identified instrument procedure(s) from the applicable host nation's AIP or terminal FLIP product(s). Select instrument or radar procedures that satisfy DOD requirements at foreign locations where a US Government agency is not responsible for IFP development provided:

3.22.1. The instrument procedure is published in an international AIP or host nation produced FLIP product. It may also be acquired as the result of a written agreement (MOU or MOA) between the MAJCOM TERPS function and the host nation aviation authority or US officials at or representing the host nation location (e.g., the applicable USDAO; local AF flying organization, etc.). This agreement shall insure that the MAJCOM is informed of changes or revisions made by the host nation as they occur. Host nation source not published in an international AIP or host nation produced FLIP product or acquired from the USDAO or local AF flying organization without this agreement shall be considered as non-accredited IAW **paragraph** 3.1.1.

3.22.2. An international aeronautical information service (i.e., NOTAMs, etc.) is available for the host nation location.

3.22.3. The procedure can be safely flown, as depicted or explained IAW **paragraph** 3.17 using USAF instrument flight procedures contained in AFI 11-202V3 and AFMAN 11-217.

**3.23. Evaluation.** When evaluating FTIP for publication, apply the guidance in Chapter 7, **paragraph** 7.3. Host nation airway structure does not require evaluation.

3.23.1. Accredited FTIP. Accredited FTIP published by the AF in the DOD FLIP (Terminal) do not require waiver action for any deviation. When the evaluation reveals noncompliance with the selected standard, all deviations must be documented in the procedure package. In conjunction with the MAJCOM Stan/Eval, determine what action (normally an operational or caution note) is necessary to allow the user to compensate for each deviation. Address each with an appropriate note in the planview to provide an equivalent level of safety. For example; "**CAUTION: CAT E short intermediate; recommend early configuration**."

3.23.2. Non-accredited FTIP.

3.23.2.1. Non-accredited FTIP to be published in the DOD FLIP (Terminal) must have a TERPS evaluation (either manual or automated) of all segments (including holding, minima, and minimum sector altitudes) completed by the MAJCOM prior to use. When performing the evaluation, apply **paragraph** A3.23.

3.23.2.2. Initiate waiver action for criteria violations to accepted standards on instrument procedures based on non-accredited host nation source. Each violation listed in the Violations, Warnings, Notes, etc. section of the GPD build or publication report must be justified. Each justification shall specify one or more easily identifiable, written, criteria reference that allows the violation. Each violation that cannot be properly justified requires waiver.

3.23.2.3. When the host publishes a straight-in procedure with circling minima and it is determined that the host procedure does not meet straight-in criteria, do not publish straight-in minima without an approved waiver; the circling minima may be published.

3.23.2.4. When the host publishes "circling only" minima and does not comply with FAA Order 8260.3, Volume 1, paragraph 162, build a circling only procedure and apply **paragraph** 3.28.14 when publishing the procedure.

**3.24. Coordination.** Obtain approval from host nation aviation or instrument procedure authorities to develop and publish new IFPs when existing host nation procedures at the airfield do not meet operational requirements or when there are no host published IFPs at the airfield.

3.24.1. Coordinate with host nation aviation and instrument procedure authorities when there is a need to establish a navigational fix and when a fix name is no longer required. Obtain approval for publication of a new fix from the host nation prior to publishing the procedure in the DOD FLIP (Terminal). **Note:** Do not apply guidance from **paragraph** 1.9 to an unnamed host nation fix when publishing the host procedure in the DOD FLIP (Terminal).

3.24.2. Obtain approval from the host nation as required in this chapter, and when altering an existing FTIP except for: higher ceiling and visibility minima; higher emergency safe altitudes; higher minimum safe altitudes; when converting metric altitudes to US equivalent; and other changes permitted by an established agreement with the host nation.

**3.25. Publishing Foreign RNAV Procedures.** When unable to determine the appropriate path terminator from host nation source, do not try to interpret the intent of the host nation or establish a path terminator for any RNAV segment. When unable to provide NGA with the appropriate segment path terminator or leg type as published in host nation source data or validated in writing (email, letter, etc.) by the responsible host nation instrument procedure authority, *do not publish* the host nation RNAV procedure in the DOD FLIP (Terminal).

**3.26. Publishing FTIP Missed Approach Procedures.**

3.26.1. When a host nation publishes more than one missed approach, publish all of them on the DOD FLIP (Terminal). Depict only one missed approach track graphically; all others will be published textually.

3.26.2. When a host nation publishes a missed approach procedure for PAR or ASR procedures, publish them in the "RADAR INSTRUMENT APPROACH MINIMUMS" section in the DOD FLIP (Terminal).

**3.27. DOD NOTAMs on FTIP Published in the DOD FLIP (Terminal).**

3.27.1. When the host nation makes changes to an instrument procedure that are or will be effective prior to the changes being published on the corresponding FTIP in the DOD publication, correct the DOD procedure by issuing a NOTAM reflecting the changes made by the host. When the host changes are extensive in nature or when a full review is not possible prior to the effective date of the host source, the DOD procedure shall be NOTAMed "NOT AUTHORIZED" as of the effective date of the new host source until the review can be completed. When the completed review reveals changes that can be corrected by NOTAM, issue the appropriate NOTAM (include required changes) to reinstate the procedure and cancel the "NOT AUTHORIZED" NOTAM. When the completed review

reveals major changes not correctable by NOTAM, keep the procedure NOTAMed "NOT AUTHORIZED" until the corrected depiction is published in the DOD FLIP (Terminal).

3.27.2. Issue NOTAMs on FTIP published in the DOD FLIP (Terminal); ensure the requirements in paragraph 2.14.4 are applied. Do not issue NOTAMs on the host nation procedure (source) or on any FTIP reviewed and posted to the AMC GDSS IAW this chapter.

**3.28. FTIP Publishing Package Content and Associated Documentation.**

3.28.1. Ensure all requests for publication sent to NGA conform to requirements in this AFI, Table 2.1, and to paragraph 5 of the "Working Agreement Between NIMA [sic] and DOD Flight Information Coordinating Committee (FCC) On Processing Foreign Terminal Instrument Procedures (FTIP)." Process Special Military Requests as described in the working agreement through HQ AFFSA/A3A at: **hqaffsa.a3a@tinker.af.mil.**

3.28.2. Complete a TAS letter for each publication request.

3.28.2.1. Do not use the phrase "Publish per host" or similar phrases when submitting FTIP for publication.

3.28.2.2. Do not combine a request for an obstacle DP in the IFR Take-Off Minimums and Departure Procedures (Delta T) section of the DOD FLIP (Terminal) with a request for an approach or a SID; a separate TAS letter for each instrument procedure (SID, obstacle DP and approach, as applicable) is required. **Note:** Ensure "**Rwy XX, Use** (NAME of host DP/SID)" is published in the IFR Take-Off Minimums and Departure Procedures (Delta T) section.

3.28.3. Publish all FTIP warning and caution notes. When host nation notes are confusing or when publishing translated host nation notes, use good judgment and ensure these notes are clear and make sense prior to publishing in DOD FLIP (Terminal).

3.28.4. Publish all FTIP procedural restrictions. FTIP documentation may be located in different sections of the host nation AIP (not directly on the FTIP). Research host nation AIP and other host documentation to ensure the DOD published FTIP is complete and accurate.

3.28.5. Publish minimum safe altitudes, minimum sector altitudes and emergency safe altitudes no lower than altitudes specified by the host nation. Combine host nation MSA inner ring sectors and sectors less than 90° to meet DOD production specifications.

3.28.6. Apply **paragraph** 1.9.9. When the host does not publish or when unable to determine IAF or IF intent from host nation documentation, coordinate with host nation instrument procedure authorities to determine IAF and IF locations prior to publication in the DOD FLIP (Terminal).

3.28.7. When the host publishes alternate minimums, convert as required to reportable values and publish all applicable alternate minima. **CAUTION:** When the DOD published version of the FTIP procedure will include the note "**NOT FOR CIVIL USE"** (for any reason), *do not publish* alternate minimums.

3.28.8. Include all FTIP feeder routes and associated data and altitudes. Terminal routes on low procedures must include course, distance and minimum altitude values. Addition of a

route not published by the host or establishing a minimum flight altitude not published by the host on a current route requires host nation instrument procedure authority approval.

3.28.9. Publish all FTIP circling restrictions.

3.28.10. Add VDPs only if specifically requested and approval for the addition is received from the host nation instrument procedure authority.

3.28.11. Ensure NAVAIDs and holding patterns not part of the instrument procedure but depicted on the FTIP are charted on the DOD procedure. These NAVAIDs and holding patterns must be specifically identified in the TAS letter for charting as an ATC requirement on the DOD procedure before NGA will add them. **Note:** Host nation ATC may require use of these NAVAIDs by DOD aircrews so they must be depicted even though not part of the instrument procedure.

3.28.12. When the FTIP depicts a time/distance table, depict a time/distance table on the DOD procedure even when DME is required for the procedure. This allows timing to be used as a back up to DME for determination of the missed approach point. When the FTIP does not depict a time/distance table and there is no indication on the FTIP or in supporting host nation source (AIP, NOTAMs, etc.) that timing may not be used, develop and publish an appropriate time/distance table IAW the following:

3.28.12.1. Convert distances expressed by the host in statute miles or kilometers to nautical miles (NM). Round this converted NM distance to the nearest tenth prior to publishing.

3.28.12.2. When the FTIP is published with a time/distance table from the FAF or from a stepdown fix to the threshold, determine where the missed approach point (MAP) is located. Develop the time/distance table based on the FAF to MAP distance or the stepdown fix to MAP distance, as appropriate.

3.28.12.3. When the host has published multiple stepdown fixes, document and publish the time/distance table from the stepdown fix nearest the MAP.

3.28.12.4. Develop and publish the flying time in minutes and seconds from FAF to MAP or from stepdown fix to MAP, as applicable.

3.28.13. When reviewing data on the FTIP in preparation for publication, compare the data to data published on area and enroute charts. Look for discrepancies in altitudes or common fix locations that should be the same on all sources. Coordinate any differences found with host nation authorities to determine the correct information.

3.28.14. Do not alter host nation FTIP identification except when de-combining the FTIP to meet DOD publication specifications or other publication requirements outlined in this AFI. When the identification differs from FAA Order 8260.3, Volume 1, paragraph 161 or paragraph 162 criteria, document the intent of the procedure. Waiver action is not required.

3.28.14.1. Example 1. Document the intent as follows: **The host nation identifies this FTIP as "TACAN/ILS RWY 22" but only provides ILS final approach guidance and minima.** Publish "**NOT AUTHORIZED**" in the S-TAC-22 minima block along with a line for ILS minima.

3.28.14.2. Example 2. Document the intent as follows: **The host nation identifies this FTIP as "TACAN RWY 35" but only provides circling minima.** Publish "**NOT AUTHORIZED**" in the S-TAC-35 minima block along with a line for CIRCLING minima.

3.28.15. Document and maintain instrument procedure packages for FTIP based on special accredited host nation source by including, at a minimum, the following:

3.28.15.1. A copy of the correspondence requesting publication of the procedure (when applicable);

3.28.15.2. A copy of the TAS letter with instructions to NGA for publication;

3.28.15.3. A copy of the host published source document (FTIP/STAR);

3.28.15.4. A copy of all approach minima calculations when the host minima are incomplete or not published on the host approach procedure. Include minima computations (showing DA/MDA/CMDA, HATh/HAA, ceiling and visibility value computations) in the procedure package. Nonprecision computations may be documented on the reverse side of AF IMT 3640, *Nonprecision Computations*. **Note:** Do not send computation sheets to NGA.

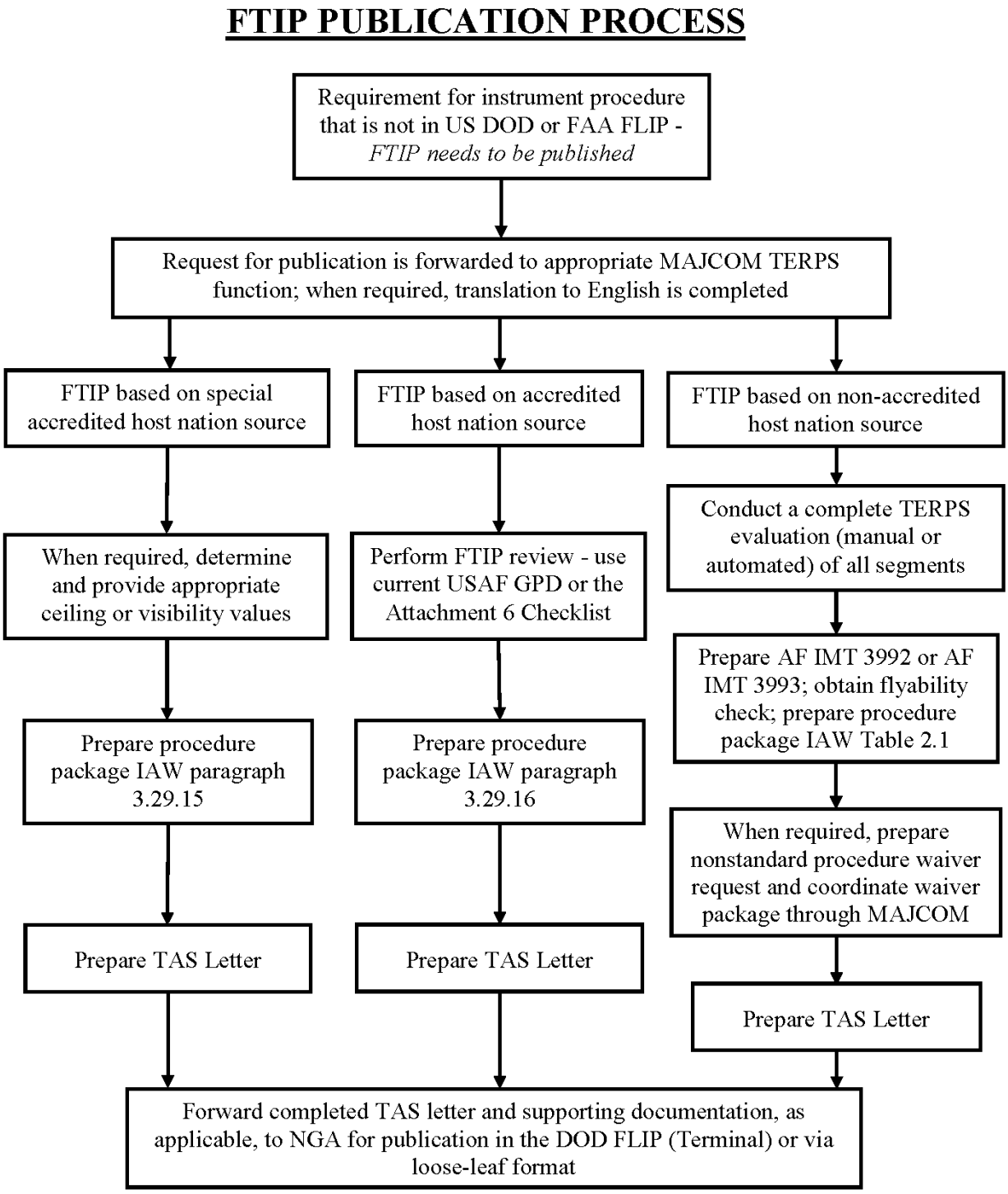
3.28.15.5. A procedure log. Track procedural changes, reviews, Auto Eval completion, and document all other actions taken to keep the instrument procedure current.

3.28.15.6. Copies of the current and most recent previous NGA produced procedure plate. **Note:** After the FTIP is published in the DOD FLIP (Terminal), the planview and profile from the DOD FLIP (Terminal) may be used to assist in illustrating changes being submitted to NGA as a procedural change.

3.28.16. In addition to the documentation requirements in **paragraph** 3.29.15, document and maintain instrument procedure packages for FTIP based on accredited host nation source by including a completed FTIP REVIEW and PUBLICATION CHECKLIST (Attachment 6).

3.28.17. Document and maintain instrument procedure packages IAW Table 2.1 for FTIP based on non-accredited host nation source. MAJCOMs shall establish approval authority signature requirements for all FTIP. Ensure all FTIP reviewed or developed with GPD include approval signatures on the AF IMT 4342, Approach/Departure Signature Page. Establish documentation requirements for host nation IFPs developed manually in a supplement to this AFI.

**Figure 3.2. Basic FTIP Publication Process.**



## Chapter 4

## FLYABILITY CHECK AND FLIGHT INSPECTION REQUIREMENTS

**4.1. Flyability Check of Instrument Procedures.** IFPs that are flight inspected by the FAA do not require a flyability check. There are three acceptable types of flyability checks; live (airborne), simulator, and tabletop. Flyability check requirements for FTIP are outlined in **paragraph** 3.17. When the MAJCOM flying authority determines a flyability check is required, ensure;

4.1.1. To the maximum extent possible, a DOD aircrew completes the flyability check.

4.1.2. Compliance with the guidance in Attachment 7.

4.1.3. It is performed within 120 days of the original request. When the flyability check cannot be completed within the allotted time, IFP development must be reinitiated and a new flyability check request should be made.

**4.2. Flight Inspection of Instrument Procedures.** Except as indicated in this AFI, IFPs developed by the AF for use in IFR or IMC shall be flight inspected IAW FAA Order 8200.1, Chapter 6. Verbal acknowledgement received from the flight inspection pilot that the new or amended procedure has passed the flight inspection will suffice for continued coordination of the IFP until signed documentation is received. Additional requirements for FTIP are outlined in **paragraph** 3.18.

4.2.1. A Flight Inspection Package consists of (in order): Cover Letter, Signature page (with POC), graphic, Publication Report, maps, 8260-2s, misc. Submit an electronic copy of the IFP package to Flight Inspection. The electronic copy shall be a single, stand-alone (PDF) of each procedure (one complete file per procedure to include cover letter). Unless stated otherwise in this AFI, each instrument procedure package submitted for flight inspection shall contain the following:

4.2.1.1. A cover letter for each instrument procedure (do not combine multiple instrument procedures on the same cover letter). The letter shall contain a requested flight inspect by date, points of contact, an address to where the completed package is to be returned, and whether or not a departure procedure will be published in a graphic or in a textual format. Clearly state whether ‘active’ (A) or ‘pending’ (P) AVNIS data was used to develop the IFP Document the Circling Approach Radius (CAR) in this cover letter.

4.2.1.1.1. List all changes to courses/distances/altitudes/ fixes/controlling obstacles in a “from-to-reason” format to assist flight inspection determine whether or not the change needs to be evaluated via airborne inspection. Example: “LOC MDA changed from 500 to 560; new controlling obstacle.”

4.2.1.1.2. When underlying data has changed due to a new survey but no NAVAIDs were physically moved, include a general statement to address the data changes in the cover letter. Example: “New survey - some coordinates and elevations have changed slightly to include HATh and HAA values.”

4.2.1.2. A copy of the GPD publication report, and when requested, a copy of the procedure build report from GPD.

4.2.1.3. Required maps. 1:100,000 scale planimetric or topographical charts are recommended. Manually produced segments must be drawn or traced directly on the chart. Do not send a single map for multiple procedures. Highlight the controlling obstacles on the map to make them easy to locate. Identify the controlling obstacles on the map with the GPD output reference number so that they correlate to the controlling obstacles listed on the approach or departure procedure publication report (as indicated on the sample controlling obstacle template in Figure 4.1). Attach a controlling obstacle template to the map.

**Figure 4.1. Sample Controlling Obstacle Template (approach procedure).**

| **Airport ID:** | KVAD | **GPD Output Reference Number** | **Segment** | **Obstruction** | **Reported MSL/AGL (if available) Elevations** | **Vertical Adjustments (accuracy, etc.)** |
|---|---|---|---|---|---|---|
| **Airport Name:** | Moody AFB | | | | | |
| **City:** | Valdosta | 424 | Initial | Tower | 497/122 | 50 ft |
| **State:** | Georgia | 4626 | Intermediate | Tower | 498/167 | 50 ft |
| **Procedure ID:** | HI-ILS Rwy 36R | 353 | Final (ILS) | Trees | 239/65 | 10 ft |
| **Amdt #:** | 3 | 485 | Final (LOC) | Antenna | 340/155 | 50 ft |
| **Scale:** | 1:100,000 | 417 | Missed Apch | Trees | 247/65 | 10 ft |
| | | 38 | Circling A-D | Water Tower | 411/80 | 50 ft |
| | | 622 | Circling E | Spot Elevation | 687/NA | 3 ft |

4.2.1.4. Graphic depiction of the procedure. This depiction may be drawn separately and included in the procedure package in the form of an attachment or as produced by GPD. IFP packages must include a graphic depiction of the procedure. The depiction may be a copy of the existing NGA graphic with changes added (penned in), a new GPD FLIP graphic depiction, or the host produced graphic obtained from the host nation AIP. All procedures shall have both the magnetic courses and true courses depicted in the plan and profile views. The true course shall be depicted within parenthesis directly above or below the magnetic course, e.g.: (240°T). When developing an IFP, the TERPS function may produce a draft product for review and coordination purposes. One of the following notes shall be published on the planview of the draft procedure: "**NOT FOR NAVIGATIONAL USE**" or "**FOR USE BY FLYABILITY OR FLIGHT CHECK AIRCREW ONLY**."

4.2.1.5. Each applicable FAA Form 8260-2. When there are no changes to the FAA Form 8260-2 and it does not require flight inspection action, annotate on the form that it is "For Information Only."

4.2.1.6. ESV request (when applicable).

4.2.1.7. Approved AF IMT 3980 (when applicable).

4.2.1.8. Any additional information to aid the flight inspection process.

4.2.2. Submit an electronic copy of the IFP package to Flight Inspection no later than 45 calendar days prior to the requested flight inspection date. Identify requested flight check by date on cover letter (see **para 4.2.1.1**).

4.2.3. Contingency and short-notice flight inspections shall be coordinated with the flight inspection office as soon as possible. Flight inspection requirements in overseas theaters may be delayed or prohibited due to country clearances and diplomatic visa requests. **Note:** The Flight Inspection Central Operations (FICO) schedules international flight inspections three months in advance; earliest possible notification of potential flight inspection requirements at OCONUS locations will improve the ability for flight inspection to respond in a timely manner.

4.2.4. The FICO provides centralized scheduling, coordination, flight planning, and flight following for flight inspection activities.

4.2.4.1. If required, mail flight inspection requests and packages to the FICO at:

MMAC AJW-391

Flight Inspection Central Operations

6500 S. MacArthur Blvd.

Bldg. #4, Room 132

Oklahoma City, OK 73169

**Note:** The FICO email address is: 9-AMC-FI-PROCEDURES@faa.gov.

4.2.4.2. To ensure request and package receipt and that the flight inspection is scheduled, contact the FAA Operations Support Office (**9-AMC-FI-PROCEDURES@faa.gov**). Additional information is available at: **http://www.faa.gov/air_traffic/flight_info/avn/flightinspection**/.

**4.3. Flight Inspection of Special Use Instrument Procedures.**

4.3.1. Standard, special use instrument procedures (paragraph 2.11) do not require flight inspection when all of the following conditions can be met to achieve an equivalent level of safety:

4.3.1.1. The special use procedure has received a live (airborne) flyability check that verifies the controlling obstacle and NAVAID reception in each segment of the procedure. **Note:** The controlling obstacle verification must be briefed to the aircrew prior to performing the flyability check sortie and the flyability check IMT must be annotated by the flyability check crew that this was completed satisfactorily.

4.3.1.2. The special use procedure uses NAVAIDs that have been flight inspected according to FAA Order 8200.1 or ICAO Annex 10. This restriction does not apply to Airborne Radar Approach (ARA) procedures.

4.3.1.3. All segments and all fixes depicted on holding patterns of the special use procedure are within the standard service volume of the applicable ground-based NAVAID(s). This restriction does not apply to ARA, ASR or PAR procedures.

4.3.1.4. The note "**ATC RADAR monitoring required**" is clearly indicated on the planview of the IFP. **Note:** This note is not required on ARA procedures.

4.3.2. The MAJCOM Commander (CC), the JFACC, the CFACC, or equivalent, may waive flight inspection whenever use of a standard or nonstandard, special use, IFP is essential due to a military emergency or an urgent military necessity. This authorization only applies to those aircraft under operational control of the authorizing MAJCOM Commander, JFACC/CFACC (or equivalent). The planview of the instrument procedure shall be annotated with the specific MAJCOM or flying unit approved to use the procedure as follows: "**FOR USE BY** (specific MAJCOM or flying unit(s), exercise or operation, as appropriate) **ACFT ONLY**."

4.3.3. When the procedure is nonstandard or when all the requirements of paragraph 4.3.1 cannot be fulfilled, the procedure requires flight inspection.

4.3.4. Flight inspection of special use procedures based on host nation source conducted by the host country (not conducted by the FAA) is acceptable as long as the host nation indicates that their instrument procedures are flight inspected *and* that the flight inspection authority adheres to either FAA Order 8200.1 or ICAO Annex 10.

**Table 4.1. MAP Scales Required for TERPS Review or Publication in DOD FLIP.**

| ITEM/SEGMENT TO BE EVALUATED | MAP SCALE REQUIRED |
|---|---|
| Intermediate – Final – Missed Approach – Circling and Departure ICA | 1:20,000 to 1:100,000 (1:250,000 scale maps may be used when 1:20,000 to 1:100,000 scale maps are not available) |
| Minimum Safe/Sector Altitudes | 1:250,000 |
| Initial Segment and Holding | 1:500,000 |
| Emergency Safe Altitudes (When applicable) | 1:500,000 to 1:1,000,000 |
| Departure Procedures (DPs) excluding ICA | 1:20,000 to 1:500,000 |

**Part 2**

**SUPPLEMENTAL INSTRUMENT PROCEDURE CRITERIA**

# Chapter 5

## INSTRUMENT DEPARTURE PROCEDURES

**5.1. Departure Procedure (DP) Development Guidance.** Develop departure procedures (DPs) IAW FAA Order 8260.44, *Civil Utilization of Area Navigation (RNAV) Departure Procedures*; FAA Order 8260.3, Volume 4; FAA Order 8260.46, *Departure Procedure (DP) Program* and FAA Order 8260.53, *Standard Instrument Departures That Use Radar Vectors to Join RNAV Routes* only when specifically indicated or supplemented in this chapter. To the extent possible, use GPD when developing departure procedures. When required, develop DPs manually.

5.1.1. DPs developed to communicate ATC clearances are referred to as Standard Instrument Departures (SIDs).

5.1.2. DPs developed to assist pilots in obstacle avoidance are referred to as Obstacle Departure Procedures (ODPs). Establish only one ODP (**paragraph** 5.3.14) per runway.

5.1.3. All DPs are subject to flight inspection except as noted in **paragraph** 4.3.1.

5.1.4. Publication of a SID does not eliminate the need to publish an ODP when 40:1 OCS penetrations exist. The Delta T symbol (▼) will be published on all instrument approach and departure procedures at an airfield when the diverse departure obstacle assessment results in penetrations to the 40:1 OCS. **Note:** Except as outlined in Chapter 3, a SID shall *not* be identified or used as an ODP in the DOD FLIP (Terminal)**.**

5.1.5. Establishment of ESAs and MSAs for graphic DPs is authorized. **Note:** Reference RNAV procedures, except for departures, establish the ESA and MSA center on the MAWP; for RNAV departures, use the DER.

5.1.6. Arc segments should not be used when developing departure procedures. When an operational requirement exists to develop a DP with an arc segment, the aircraft must be at or above the MVA prior to starting the arc. Use the highest MVA elevation along the entire arc segment OIS as the beginning arc altitude. Arcing departures are nonstandard IFPs. Ensure the note "**ATC RADAR required**" is charted on the IFP. See FAA Order 8260.3b, paragraph 232 or PAN-Ops Chapter 3.3. for arc OIS dimensions.

5.1.7. Publish minimum and ATC climb rates in a vertical velocity chart (**paragraph** 1.16.7).

5.1.8. Publish the location of low, close-in obstacles IAW **paragraph** 5.3.1.

5.1.9. Computer codes (CIDs). Coordinate all departure procedures that affect the NAS with the appropriate FAA ATC facility IAW FAA Order 8260.46. OCONUS MAJCOM TERPS functions shall determine whether or not DPs that affect host nation airspace require coordination with host nation ATC officials for host nation assigned computer codes.

**5.2. RNAV Departure Procedures.** Use FAA Order 8260.44, *Civil Utilization of Area Navigation (RNAV) Departure Procedures*, and other applicable FAA orders, as specified, when developing RNAV departure procedures. IAW FAA Order 8260.46, annotate each USAF RNAV departure procedure with the following 3 notes: "**GPS REQUIRED",** "**RNAV-1"** and **"RADAR REQUIRED FOR NON-GPS EQUIPPED AIRCRAFT"**.

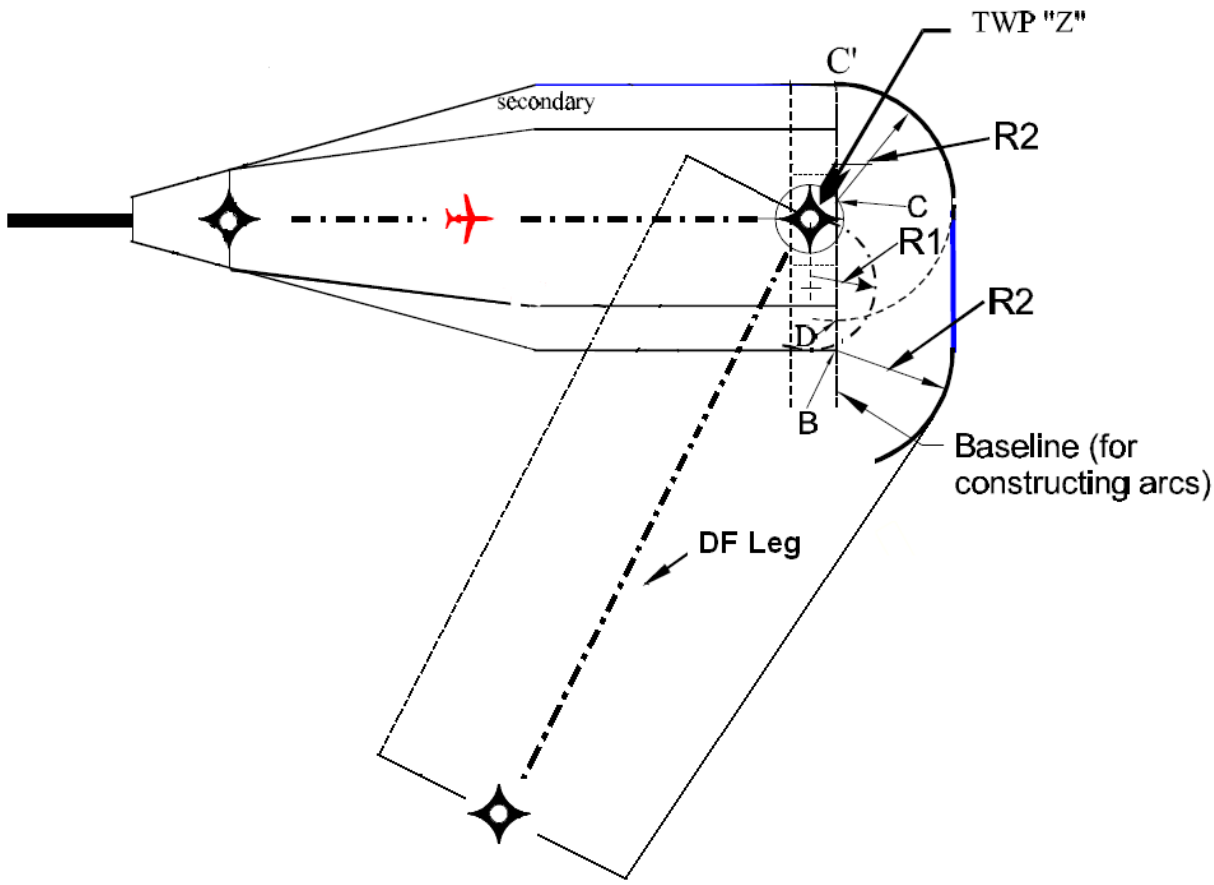
5.2.1. FAA Order 8260.46, Appendix A, paragraph 5.b., Leg Types. The following leg types are the only types authorized for AF developed RNAV departure procedures: Direct-to-Fix (DF), Course-to-Fix (CF), Track-to-Fix (TF), and Heading-to-an-Altitude (VA).

5.2.2. FAA Order 8260.44, paragraph 12.3.9; Direct to Fix Leg, Turns more than 120°, Fly-Over WP. For all turns greater than 90° at fly-over waypoints, construct the outside turn expansion area (Figure 5.1) as follows:

5.2.2.1. The dimensions of the R2 arcs drawn to form the outside boundaries of the turning areas are radii selected from FAA Order 8260.3, Volume 4, Table 3-2, with the appropriate secondary dimension width added.

5.2.2.2. Join the turn expansion area by tangent to the full basic width abeam the next waypoint (DF legs) or by tangent 30° inward towards the departure course to establish the primary and secondary areas after the turn (TF legs).

**Figure 5.1. Turns Greater Than 90° at a Fly-over Waypoint.**




**5.3. Supplemented Departure Criteria.** Use criteria in this paragraph in conjunction with the indicated chapters and paragraphs from FAA Order 8260.3, Volume 4, and FAA Order 8260.46. Except when applying **paragraph** 3.11, the departure OCS shall begin at the DER at the DER elevation.

5.3.1. FAA Order 8260.3, Volume 4, Paragraph 1.3.1; Low, Close-in OCS Penetrations. Those obstacles identified within the ICA that penetrate a 40:1 OCS and require a CG in excess of 200 ft/NM to a climb-to-altitude of 200 feet or less above the DER elevation are known as low, close-in obstacles. Do not publish any climb gradient to avoid these obstacles. Apply **paragraph** 1.16.6 when calculating departure climb gradients to avoid obstacles that penetrate the 40:1 OCS. **Note:** When the DOD Option formula is used to determine the climb gradient, this formula will be used to determine whether or not the obstacle is classified as a "low, close-in" obstacle.

5.3.1.1. Identify obstacle(s) requiring such a climb gradient by publishing takeoff obstacle notes in the IFR Take-Off Minimums and (Obstacle) Departure Procedures section of the DOD FLIP (Terminal). Specify obstacle type, location relative to the DER, height (AGL), and elevation (MSL). Do not add accuracy values to the reported heights/elevations.

5.3.1.2. Publish takeoff obstacle notes using the following format: "**RWY 35, trees 2,430′ from DER, 50′ right of centerline, 120′ AGL/2,220′ MSL**" or "**RWY 22L, aircraft tail 270′ from DER, 190′ left of centerline, 40′ AGL/1,480′ MSL.**" **Note:** When takeoff obstacle notes are published, there is no requirement to list the same obstacle(s) on a graphic depiction of a DP.

5.3.1.3. When the noted takeoff obstacle is terrain, only list the MSL height; do not list an AGL height of "0" feet.

5.3.1.3.1. When multiple terrain points are relatively close together and of similar height, group them together in a single entry in the following format: "**RWY 04, terrain beginning 16′ from DER, 500′ left of centerline, up to 4305′ MSL.**"

5.3.1.3.2. When grouping numerous terrain points is impractical, group together as many as possible in the single entry and list the remaining points individually.

5.3.1.4. See FAA Order 8260.46 for additional sample notes for trees, antennas, and buildings.

5.3.2. FAA Order 8260.3, Volume 4, Paragraph 1.4.1; Calculating Climb Gradients to Clear Obstacles. At host nation locations and all AF OCONUS locations where the AF exercises TERPS authority, the Standard formula is not authorized; use the DOD Option formula. The note "**NOT FOR CIVIL USE**" is not required on these procedures. **Note:** The DOD option is not authorized when applying NATO/PANS-OPS Criteria (Chapter 7).

5.3.3. FAA Order 8260.3, Volume 4, Paragraph 1.4.2; Calculating the CG Termination Altitude. When calculating the climb-to-altitude (CTA), use the un-rounded CG from either of the formulas from FAA Order 8260.3, Volume 4, paragraph 1.4.1.

5.3.3.1. Document all manual CTA calculations in the procedure package. When the un-rounded value falls between two 100-foot increments, the published CTA value shall be rounded up to the higher 100-foot increment.

5.3.3.2. When the controlling obstacle is in the secondary area, calculate the equivalent height IAW **paragraph** A3.11.1. Then calculate the CG and CTA as if the obstacle was located in the primary area.

5.3.4. FAA Order 8260.3, Volume 4, Paragraph 1.4.3; Climb Gradients to Altitudes for Other than Obstacles, i.e., ATC. Distance "D" is measured from DER to the point where the altitude is required.

5.3.5. FAA Order 8260.3, Volume 4, Paragraph 1.4.4; Multiple Climb Gradients Application. This paragraph applies to obstacle driven climb gradients only. When a departure utilizes multiple transitions, evaluate each transition separately. Publish the climb gradient from DER for each transition requiring a climb gradient greater than 200 ft/NM. **Note:** When an ATC climb rate is required after an obstacle climb rate, it may be established beginning at the point where the obstacle climb rate has terminated.

5.3.6. FAA Order 8260.3, Volume 4, Paragraph 1.4.5, Limiting Takeoff Runway Available (TORA) to Reduce Climb Gradient. Do not apply this criteria.

5.3.6.1. When required by FAA Order 8260.46, Table 1, and IAW **paragraph** 5.3.14 of this instruction, provide an option to reduce the available takeoff runway length [reduced takeoff runway length (RTRL) departure procedure] based on the most penetrating obstacle to the 40:1 departure OCS. **Note:** This option *is not authorized* when the obstacle penetrates the OCS by more than 35 feet.

5.3.6.2. Where p = the amount of penetration to the 40:1 OCS, calculate the reduced takeoff runway length (value n) using the following formula (when publishing the reduced takeoff runway length value, round the result upward to the next 100-foot increment):

$$n = 30.38 \times (p + 35)$$

5.3.6.3. Example: An obstacle is located 12,000 feet from DER. The 40:1 OCS surface rise from DER to the obstacle is 300 feet (12,000 ÷ 40 = 300). The obstacle penetrates the 40:1 OCS at this point by 23 feet; n = 30.38 × (23 + 35); n = 1762.04 (round up to 1,800).

5.3.6.4. Publish a RTRL departure procedure in the IFR Take-off Minimums and (Obstacle) Departure Procedures section of the DOD FLIP (Terminal) in the following format:

**<u>TAKE-OFF MINIMUMS:</u>**

**RWY 13: 500-3, or standard with minimum climb of 230 feet per NM to 5600 feet. Alternatively, with standard takeoff minimums and normal 200 feet per NM climb gradient, takeoff must occur no later than 1,800 feet prior to departure end of runway.**

5.3.7. FAA Order 8260.3, Volume 4, Paragraph 1.4.6; Effect of DER-to-Obstacle Distance. Do not apply this criteria. Apply the applicable required actions from FAA Order 8260.46, Table 1 (**paragraph** 5.3.14).

5.3.8. FAA Order 8260.3, Volume 4, Paragraph 1.6.2a; Length. Ensure the initial climb area (ICA) length is sufficient for an aircraft to reach 400 feet above the DER elevation.

5.3.8.1. A climb gradient in excess of 200 ft/NM may be used to reduce the length of the ICA to less than 2 NM. By increasing the CG in the following formula, the length of the

ICA can be adjusted as required: c ÷ CG = length of ICA in NM. **Note:** c = desired turn elevation above DER (enter an AGL value; normally 400).

5.3.8.2. Departures requiring an early turn (turn at an altitude less than 400 feet above DER) are nonstandard and require waiver. Publish the note "**NOT FOR CIVIL USE**" on departures when applying this option.

5.3.9. FAA Order 8260.3, Volume 4, Paragraph 2.3; DVA EVALUATION (ASR Required). Supplemental DVA guidance will be published in AFMAN 13-215, Volume 2.

5.3.10. FAA Order 8260.3, Volume 4, Paragraph 3.1; DEAD RECKONING (DR) DEPARTURE. When operational necessity dictates, DR segments may extend more than 10 NM from the DER; however, when applying this option, the DP is nonstandard and requires waiver.

5.3.10.1. When a DR segment extends more than 10 NM from the DER the area continues to splay to points abeam the point where positive course guidance (PCG) is established or to the end of the departure.

5.3.10.2. Publish headings (not DR tracks) to be flown. For example: "**Climb heading 220 to 3000 …**" or "**Climbing left turn direct ABC VOR …**".

5.3.11. FAA Order 8260.3, Volume 4, Paragraph 3.5; TURNING SEGMENT CONSTRUCTION; 3.5.1. General. The minimum airspeed allowed for Category E aircraft shall be 310 KIAS.

5.3.12. FAA Order 8260.3, Volume 4, Paragraph 3.8; MULTIPLE TURNS.

5.3.12.1. A secondary area is authorized on the outside of a turn when the segment after the turn is established on a radial towards the NAVAID providing positive course guidance for the segment. Construct the secondary area by continuing the outside turn expansion area, 30° relative to the departure course, until the expansion joins the primary width of the trapezoid to establish point C as illustrated in Figure 5.2 and Figure 5.3. This secondary area is defined by the area bound by points A, B and C in Figure 5.2. When the termination point is established prior to the facility, the secondary area is defined by the area bound by points A, B, D and C in Figure 5.3.

**Figure 5.2. Secondary Areas on the Outside of a Turn for Subsequent Turns.**

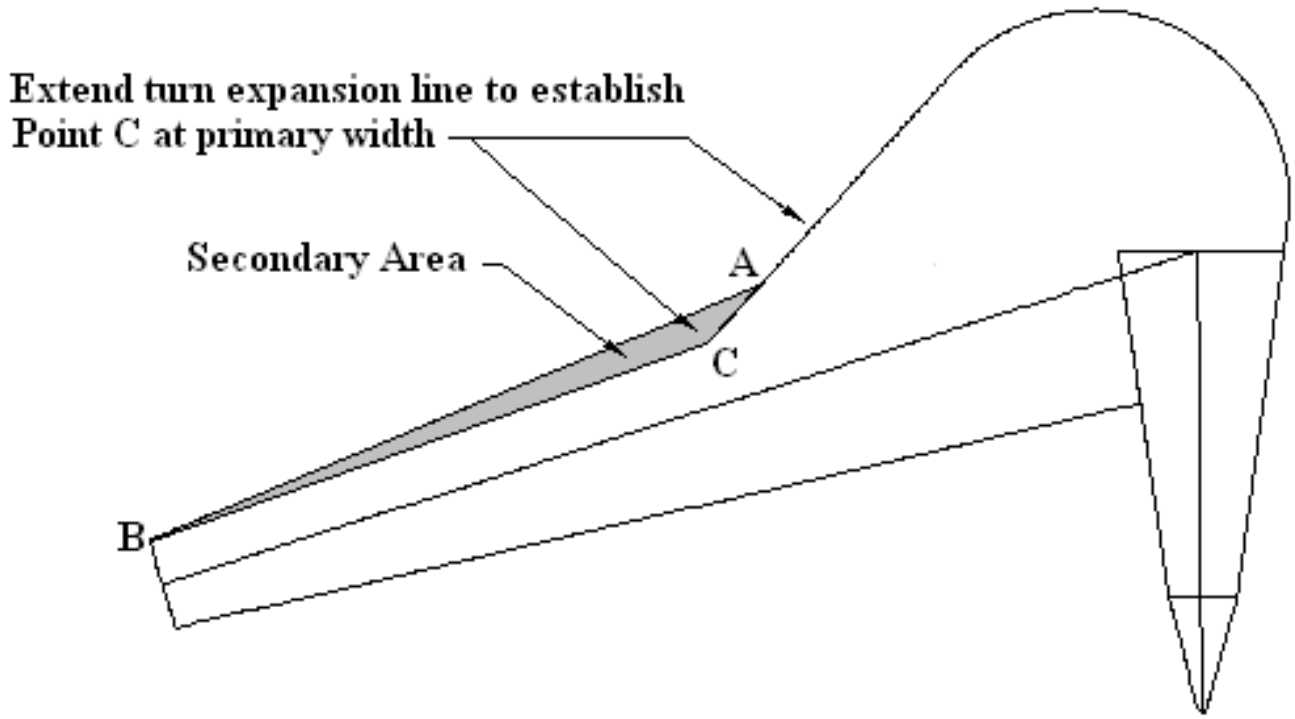
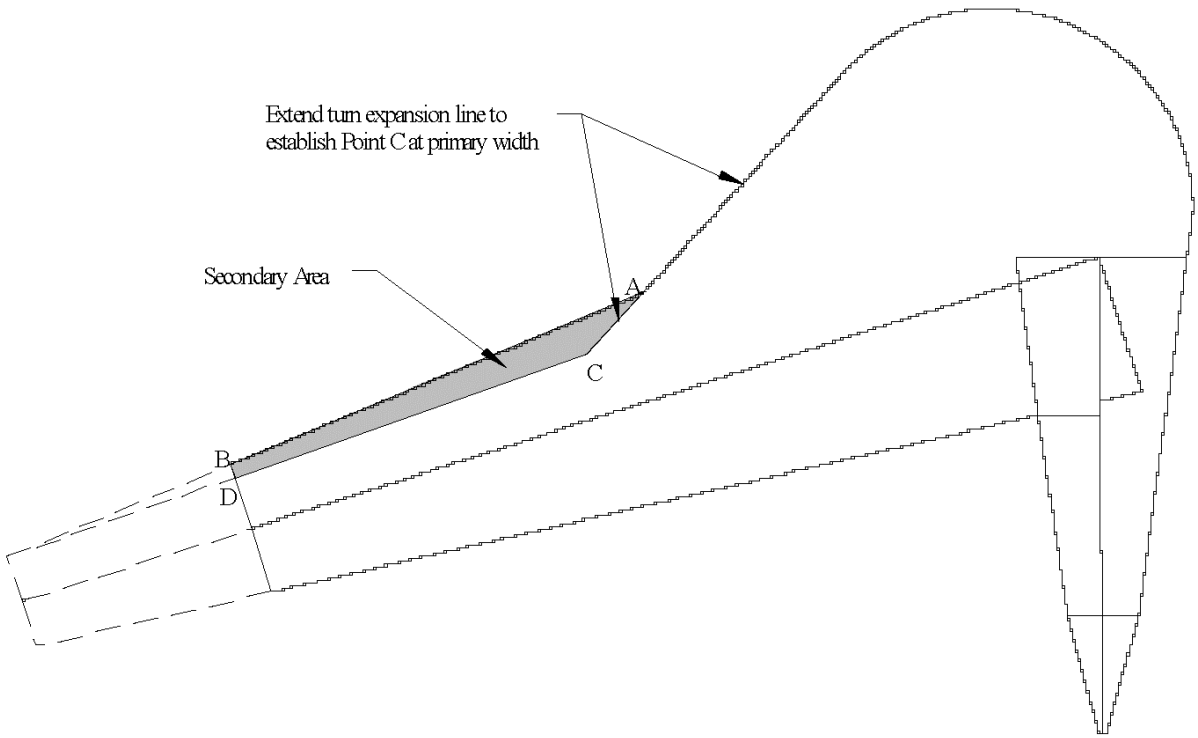
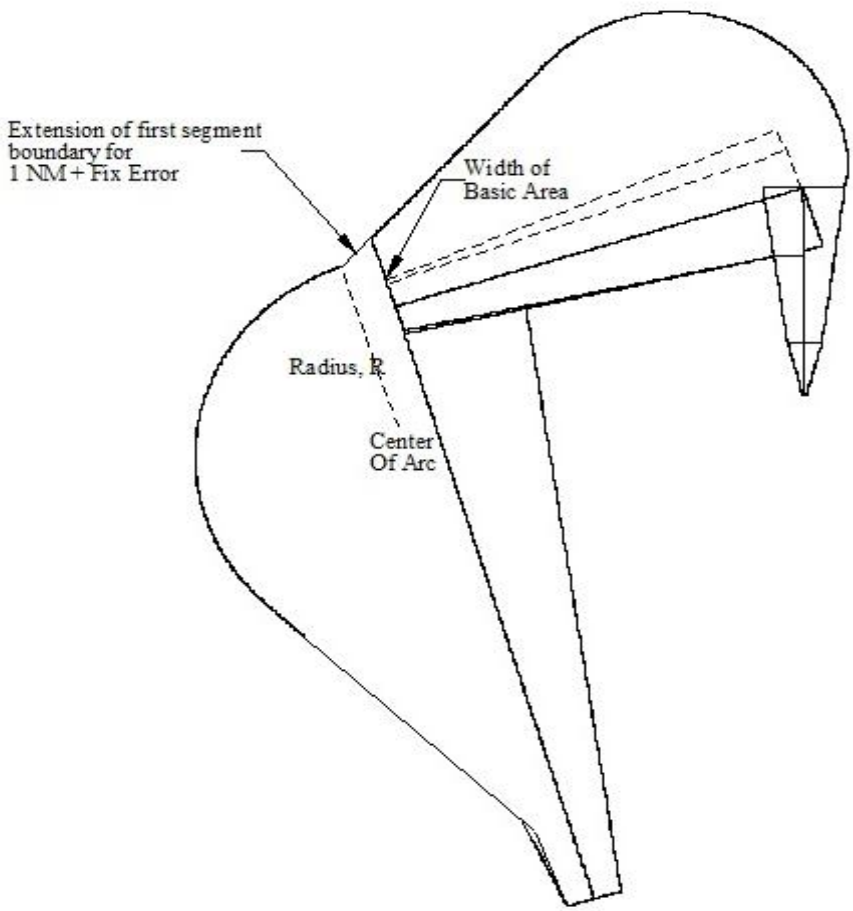


**Figure 5.3. Secondary Areas on the Outside of a Turn for Subsequent Turns When the Termination Point is Prior to the Facility.**




5.3.12.2. When multiple turns exist and the width of the first segment on the outside of the turn at the end of the first segment is wider than the width of the basic area at that point, construct the area on the outside of the turn based upon the width of the area at the end of the first segment (not on the width of the basic area at the end of the first segment). The start of the outside expansion area is an extension of the boundary of the first segment for 1 NM plus fix error (Figure 5.4).

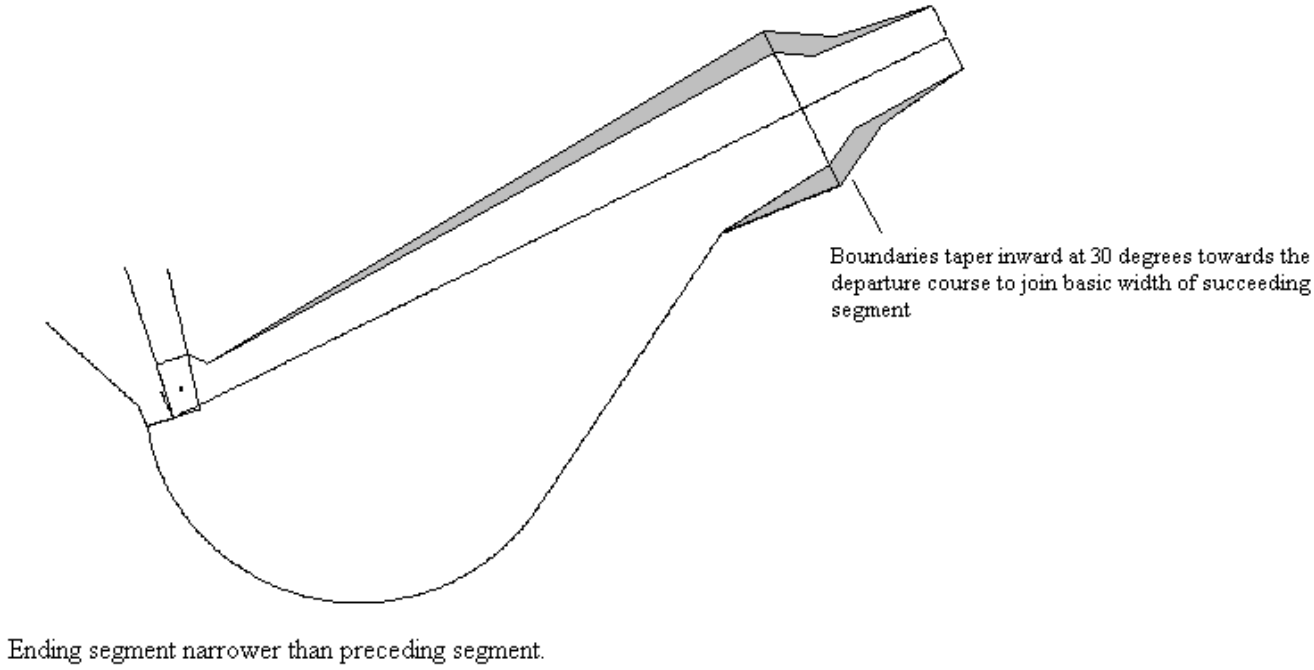
**Figure 5.4. Area on the Outside of the Turn When the Width of the Previous Subsegment is Greater Than the Basic Area Width of the Succeeding Subsegment.**




5.3.12.3. Departure routes containing two successive segments where different facilities are providing course guidance may have different segment widths when no turn (or a negligible turn) exists where the segments join.

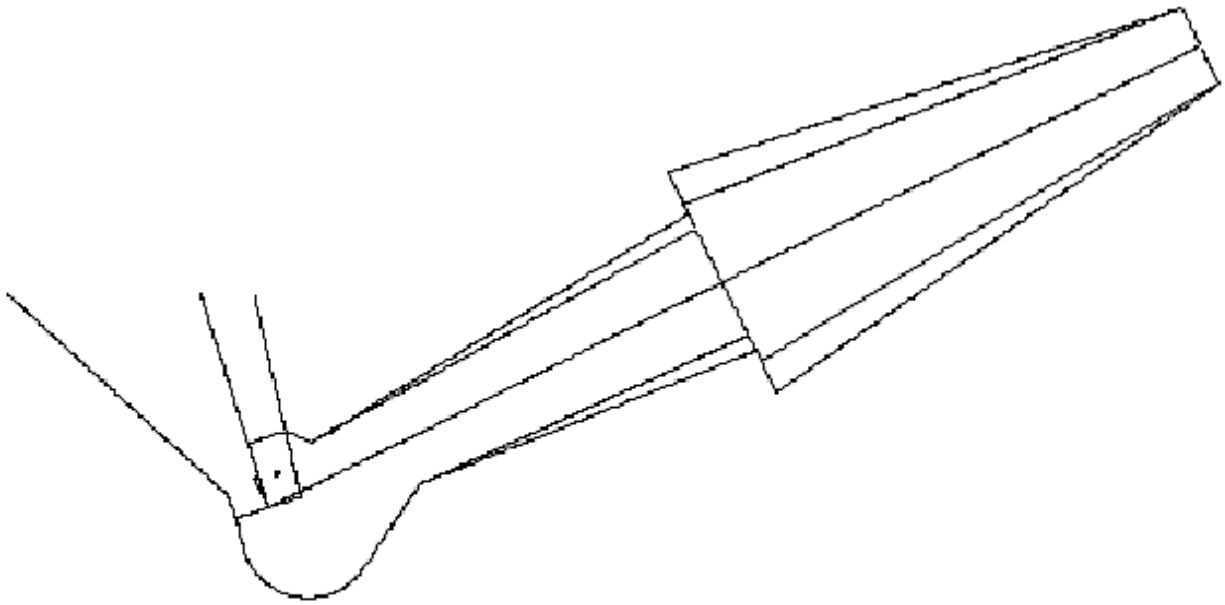
5.3.12.3.1. Where the preceding segment is wider than the succeeding segment, the primary and secondary area boundaries shall taper inward at 30° towards the course line until they join the primary and secondary areas (as appropriate) of the succeeding segment (Figure 5.5).

**Figure 5.5. Negligible Turns with Different Facilities; Succeeding Segment Narrower Than Preceding Segment.**




5.3.12.3.2. Where the preceding segment's ending width is narrower than the succeeding segment's beginning width, no adjustment is required (Figure 5.6).

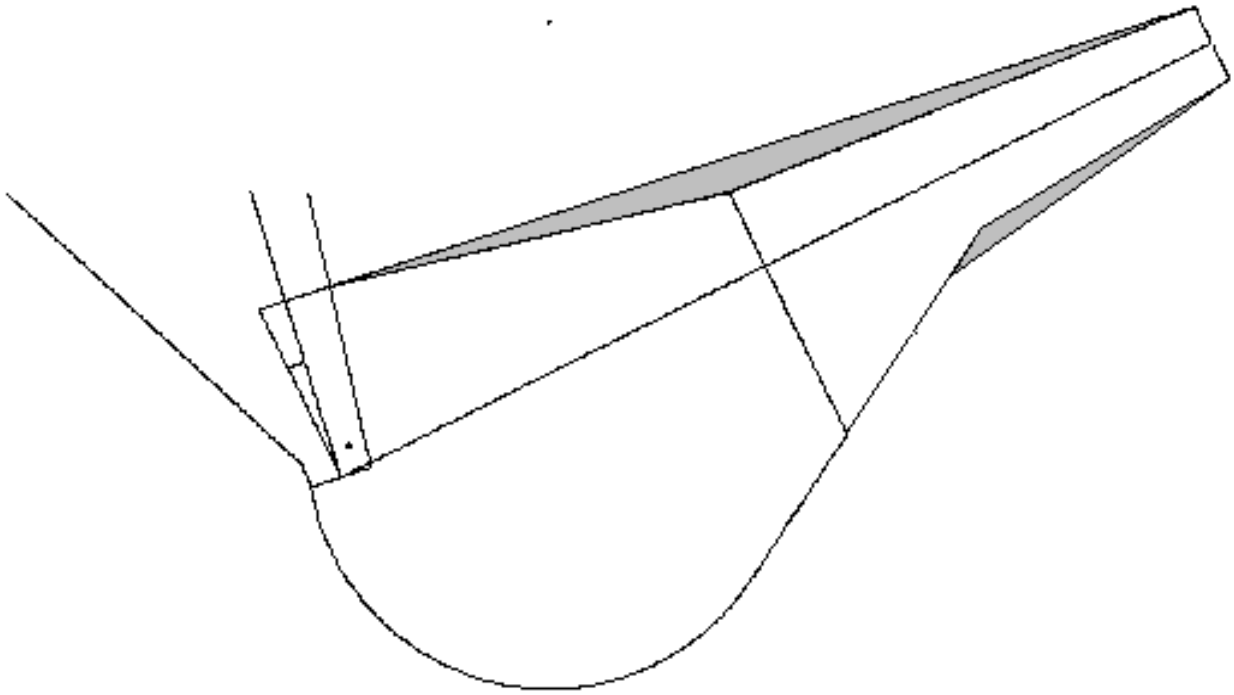
**Figure 5.6. Negligible Turns with Different Facilities; Preceding Segment Narrower Than Succeeding Segment.**



Preceeding segment narrower than succeeding segment; no adjustment required.

5.3.12.4. When a turn is followed by two successive segments using the same facility, it is possible for the outside turn expansion to have not completed its inward taper prior to the end of the first segment after the turn. In these cases, the line defining the outside turn expansion shall be drawn at 30° from the centerline of the succeeding segment until it joins the next segment. The leg length of the succeeding segment may require adjustment if the extended line does not join the next segment (Figure 5.7). **Note:** When the last sub-segment of a departure procedure contains a turn, it is possible for the outside turn expansion to have not completed its inward taper prior to the end of the segment. In this case, the length of the last sub-segment must be extended to allow the inward taper of the turn expansion to complete. The inward taper of the turn expansion is complete when the inward taper intersects the outer boundary of the primary area of the trapezoid defining the segment at the final fix.

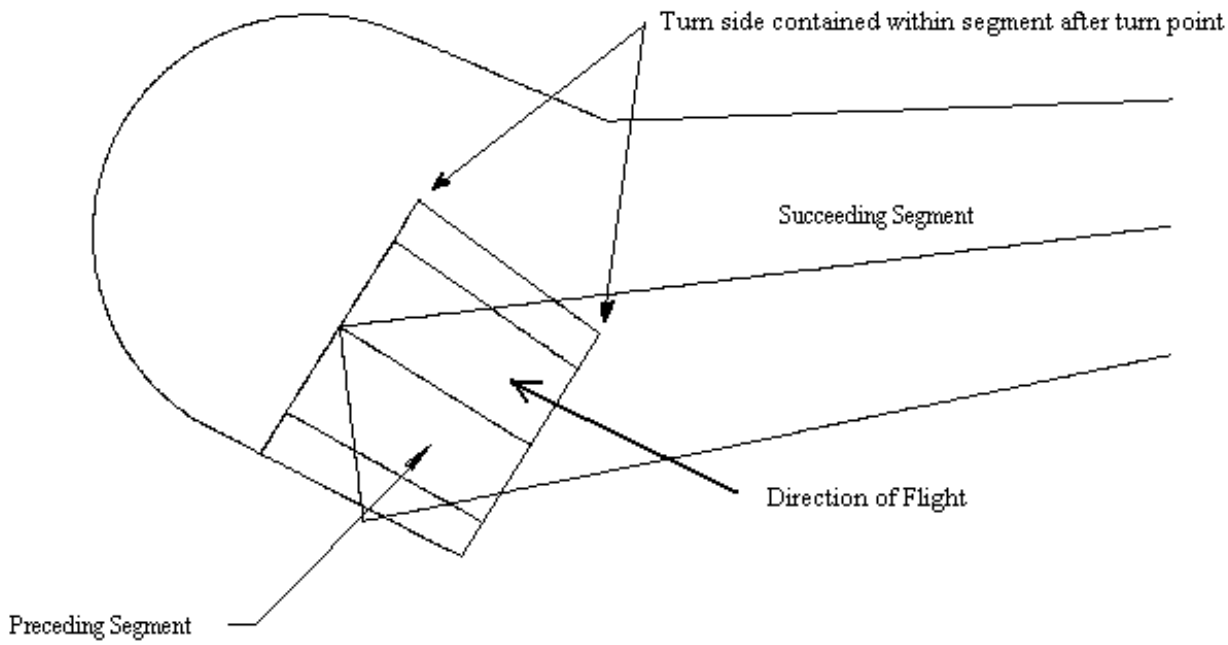
**Figure 5.7. Outer Boundary Turn Expansion Continued to Join the Next Segment.**



Outer boundary turn expansion continued to join next segment.

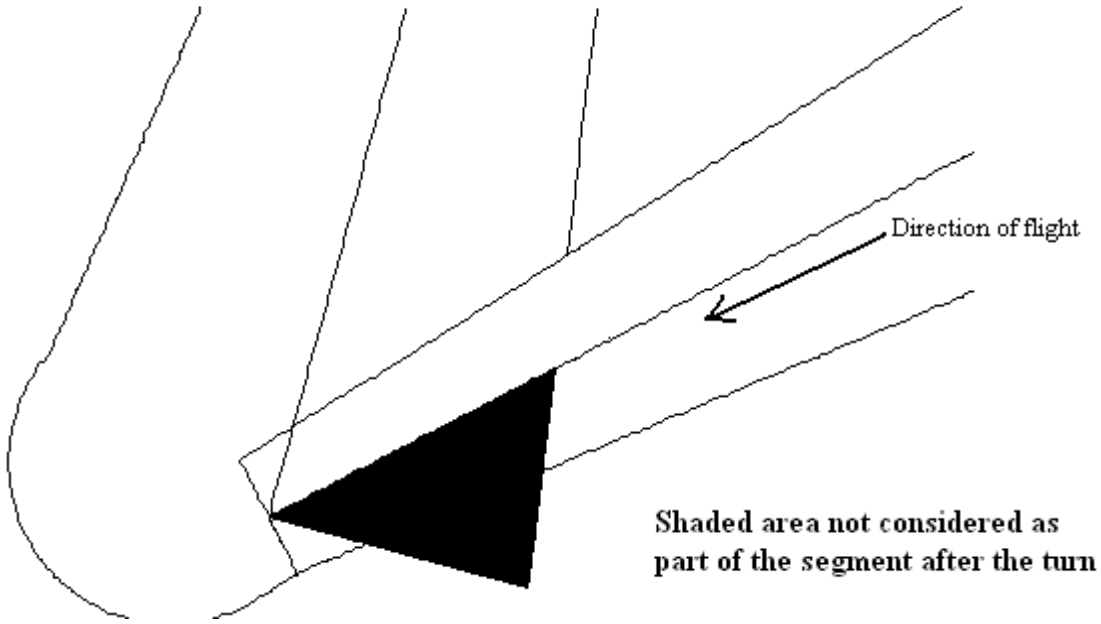
5.3.12.5. Turns greater than 90° do not require an inside turn expansion when the preceding segment, from centerline to the outer boundary of the secondary area on the side of the turn, is fully contained within the basic area of the segment after the turn (Figure 5.8).

**Figure 5.8. Turn Side Contained Within the Segment after the Turn Point.**



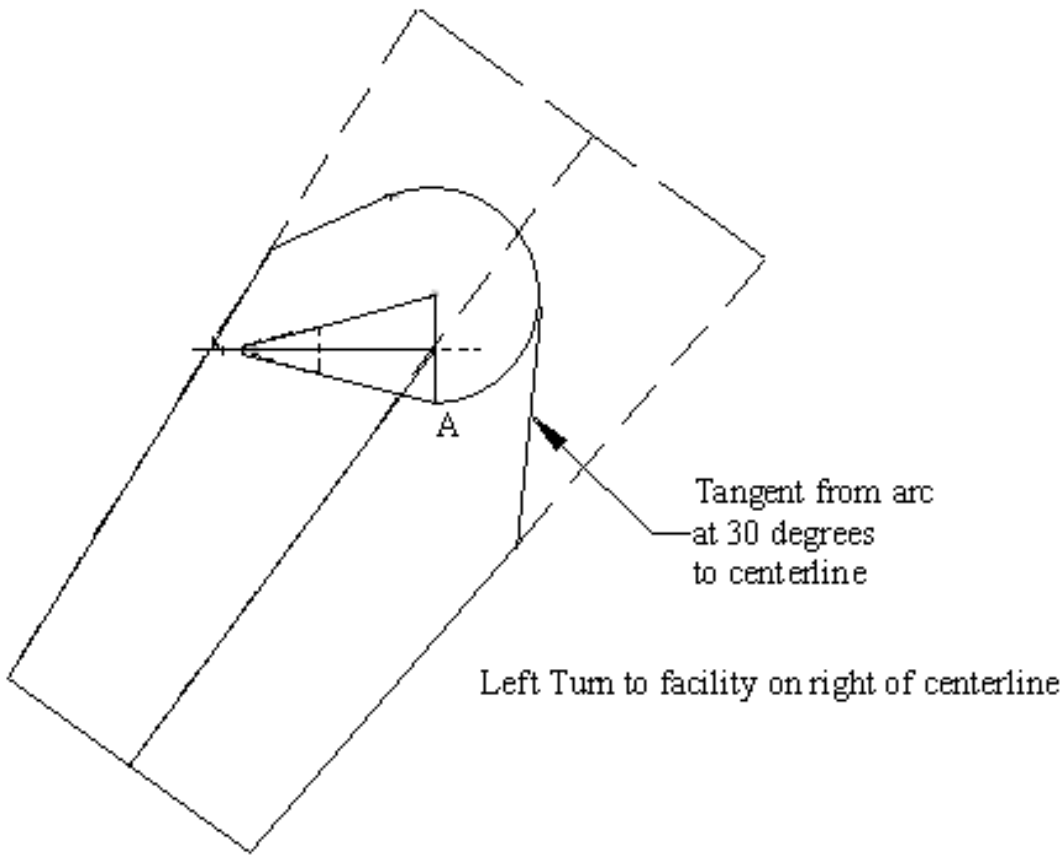

5.3.12.6. For turns greater than 90°, the area of the succeeding segment that lies outside the centerline of the preceding segment and prior to the turn fix shall not be considered as part of the succeeding segment (Figure 5.9).

**Figure 5.9. Area Not Considered as Part of the Succeeding Segment.**



5.3.12.7. For turns greater than 150° following a climb-to-altitude where point A is inside the basic area of the facility, a line tangent to the outer boundary radius shall be drawn at 30° from the centerline of the succeeding segment to join the succeeding segment's outer boundary. When a tangent does not exist, then point A shall be used (Figure 5.10).

**Figure 5.10. Construction with Tangent to Outer Boundary Arc.**




Construction with tangent to outer boundary arc

5.3.12.8. When a climb-to-altitude followed by a turn direct to facility is constructed, the segment's outer boundary area will be defined as a line from point A to the tangent of the outer boundary, point B (Figure 5.11). The taper of this line will not exceed 30° relative to the course line. When the 30° maximum is used and the line will not intersect point A at the basic area width, expand the width of the basic area at point A to intersect the outer boundary line (Figure 5.12).

**Figure 5.11. Construction with Tangent to Outer Boundary Arc; Standard Half-width at Point A.**

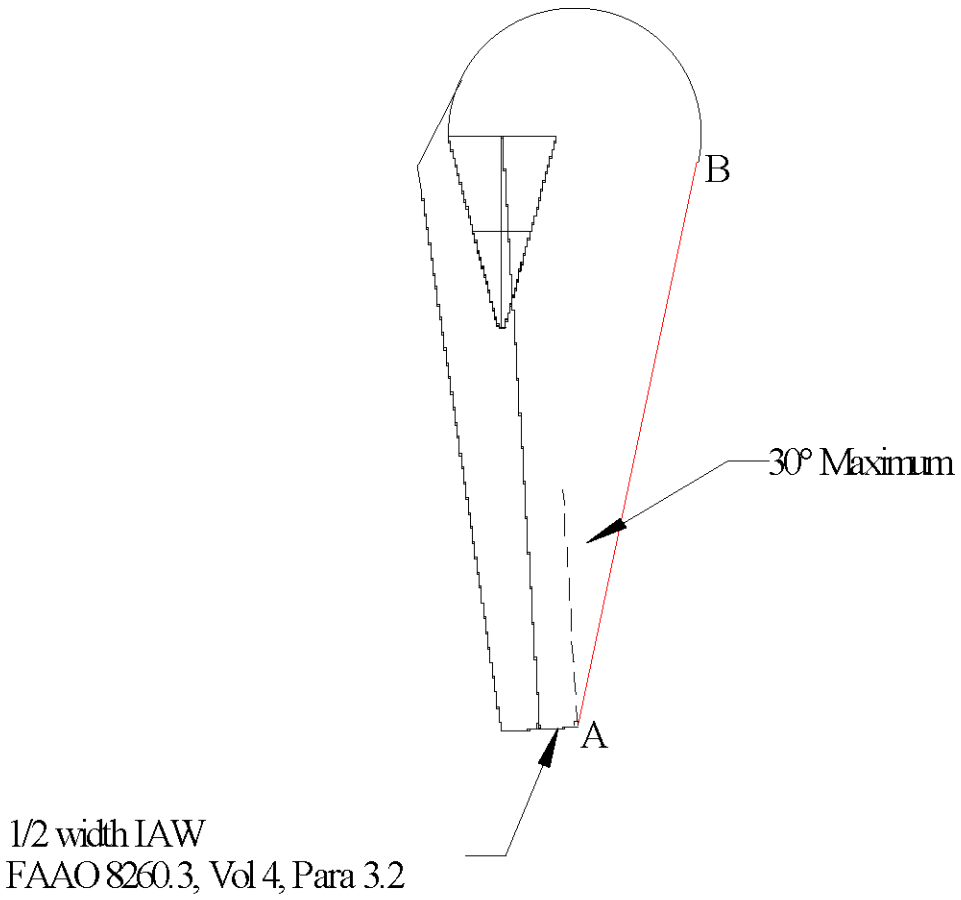
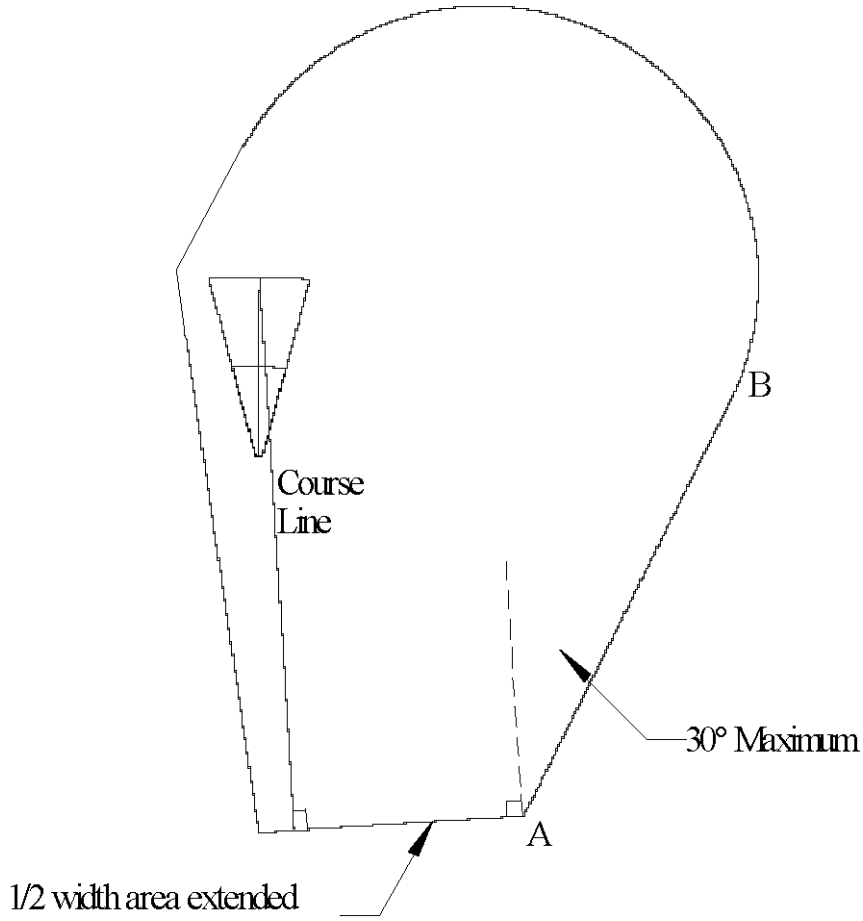
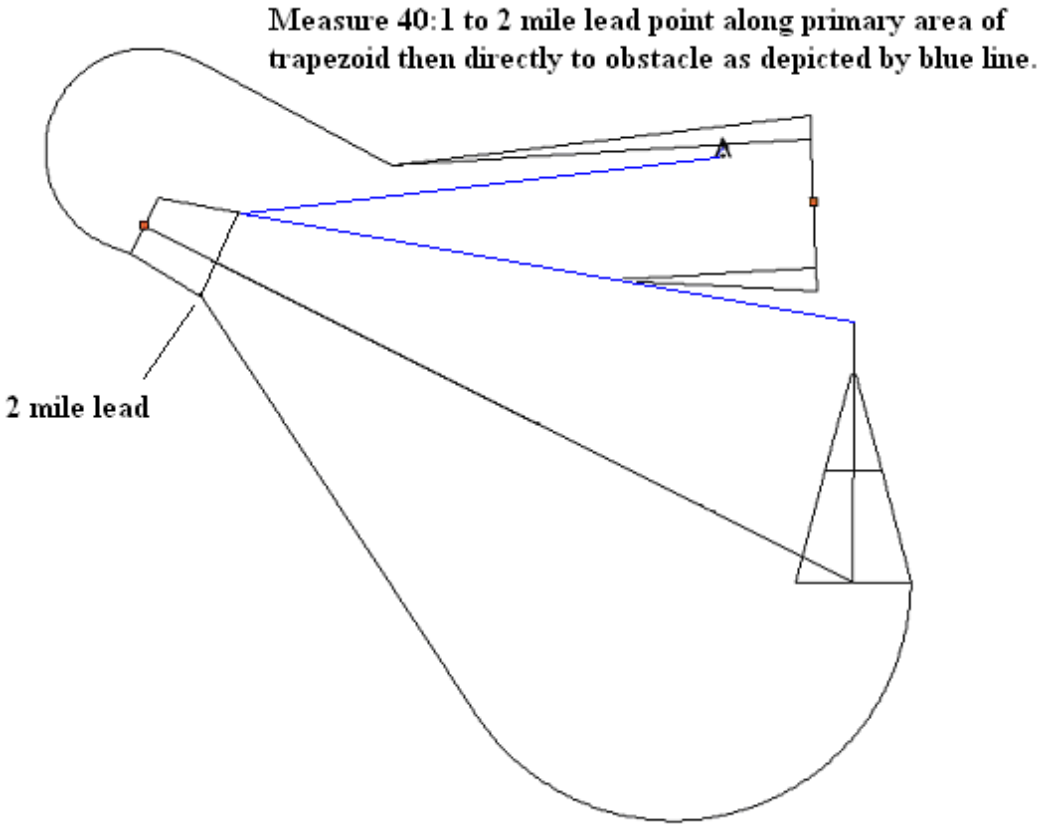


**Figure 5.12. Construction with Tangent to Outer Boundary Arc; Extended Half-width at Point A.**




5.3.12.9. Distance measurements for obstacle evaluations (turns greater than 90°) shall be made to a point formed by a line drawn perpendicular to the course 2 NM prior to each turn fix at the inside boundary of the primary area, then directly to the obstacle. This method shall also be applied to distance measurements for obstacles in succeeding segments (Figure 5.13).

**Figure 5.13. Distance Measurements for Obstacle Evaluations; Turns Greater than 90°.**




5.3.13. FAA Order 8260.3, Volume 4, Chapter 4, Visual Climb Over Airport (VCOA). Develop VCOAs in conjunction with an ODP per Table 1, ODP Development Combinations, from FAA Order 8260.46. Publish VCOAs in the IFR Take-off Minimums and (Obstacle) Departure Procedures section in a textual format only. When ODP development is not possible or practical, a stand-alone VCOA is authorized. Use this paragraph to justify the GPD generated violation for a stand-alone VCOA. **Note:** Do not build or publish VCOA procedures when ATC management has determined a VCOA is not operationally feasible. This determination shall be in writing and a copy shall be maintained in the departure procedure package. When ATC has made this determination and a VCOA is not developed, GPD will generate a violation indicating the ODP rules have not been satisfied. Justify this violation with "**ATC has determined a VCOA is not operationally feasible; see documentation in procedure package"** on the justification tab of the violation dialog of GPD. Do not pursue waiver action for this violation.

5.3.13.1. **Paragraph 4 1**, BASIC AREA. The radius of the visual climb area (VCA) is the appropriate radius in NM from FAA Order 8260.3, Table 4-1, Radius Values, ***plus*** the greater of:

5.3.13.1.1. The distance from the ARP to the furthest end of any runway at the aerodrome or

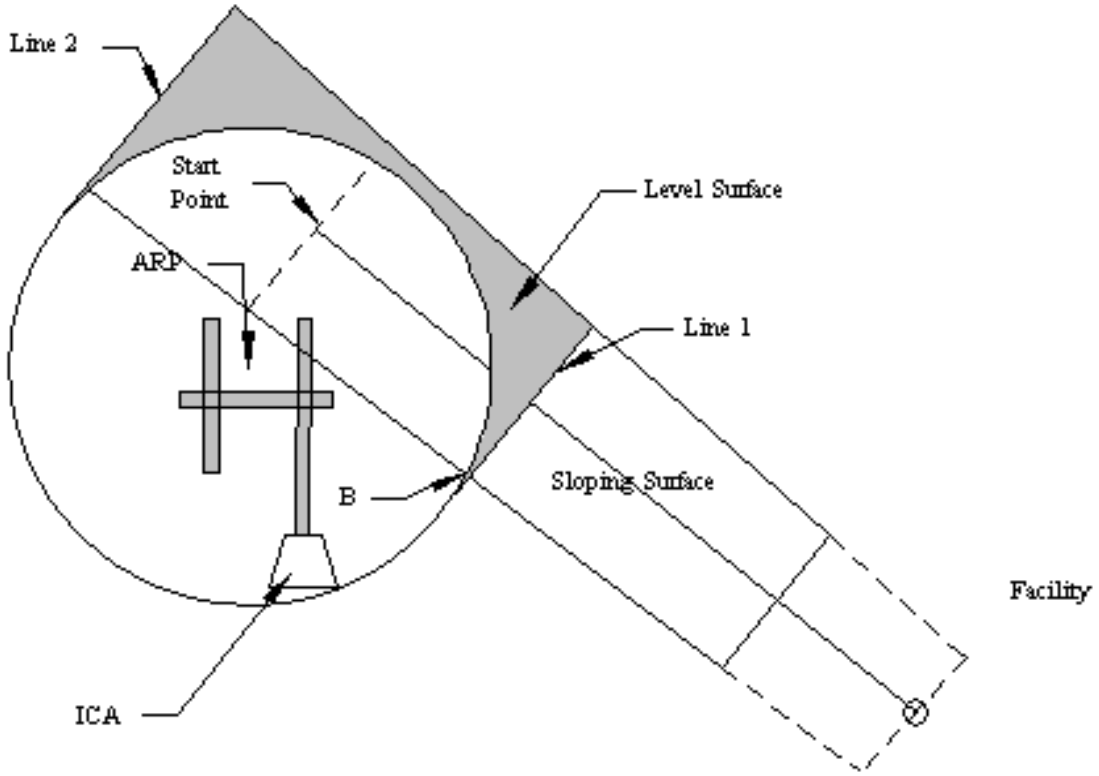
5.3.13.1.2. The distance from the ARP to the furthest point on the ICA end-line (ICAE) for the runway associated with the VCOA.

5.3.13.2. Paragraph 4.2, VCOA EVALUATION.

5.3.13.2.1. VCOA diverse areas are evaluated to 25 NM for non-mountainous areas and to 46 NM for designated mountainous areas.

5.3.13.2.2. For basic areas that exceed the lateral limits of the VCA, the level surface is extended from the points of tangency on both sides of the VCA with lines drawn perpendicular to the route (lines 1 and 2 of Figure 5.14) and bounded by the side of the basic route outside of the VCA (shaded area of Figure 5.14).

**Figure 5.14. Basic VCOA Area Extension.**




5.3.13.2.3. Subsequent turns on routes are developed as for normal route departures and holding is authorized at the end of a route segment.

5.3.13.3. **Paragraph 4 2.3**, Published Annotations. Preface all VCOA departures with the applicable runway number and the phrase "for climb in visual conditions." **Note:** Publish low, close-in obstacles IAW **paragraph** 5.1.8; other obstacles identified in the VCOA evaluation are not published.

5.3.13.3.1. The fix/location specified to cross shall be the airport name for a VCOA diverse.

5.3.13.3.2. The fix/location specified for a VCOA route shall be the start fix used to develop the procedure. Publish the airport name when the start fix is the airport. When a fix is utilized, publish the 5-letter name of the fix.

5.3.13.3.3. Publish the radius of the VCA as a distance to remain within during the climb in visual conditions. VCA radii greater than 2 NM but less than 3 NM shall be

rounded downward to the next ¼ NM increment. VCA radii of 3 NM or more shall be rounded downward to the next whole NM increment.

5.3.13.3.4. Ensure each VCOA includes the instruction to advise ATC prior to execution. The following format is required: "**RWY 9; Obtain ATC approval for VCOA when requesting IFR clearance. Climb in visual conditions to cross McAllen airport at or above 6000 before proceeding on course. Remain within 4.0 NM of McAllen airport during climb in visual conditions."**

5.3.13.4. **Paragraph 4 3**, CEILING AND VISIBILITY. The published ceiling and visibility associated with the VCOA procedure shall be followed by, "for climb in visual conditions." Example: "**4400-3 for climb in visual conditions.**"

5.3.14. FAA Order 8260.46, Paragraph 2-1. DEPARTURE PROCEDURE GUIDELINES, b. Obstacle DPs, Table 1, ODP Development Combinations. The results of diverse departure obstacle assessments shall be classified as one of nine ODP cases. Required actions based on each ODP case may be a single action or a combination of actions from Table 1. **Note:** Each ODP combination defined in paragraph 5.3.14.6 constitutes *one* ODP.

5.3.14.1. Obstacle Departure Procedure (ODP) – a single action or a combination of actions developed to assist departing aircraft avoid obstacles that penetrate a 40:1 OCS. Only one ODP will be developed and published for each runway.

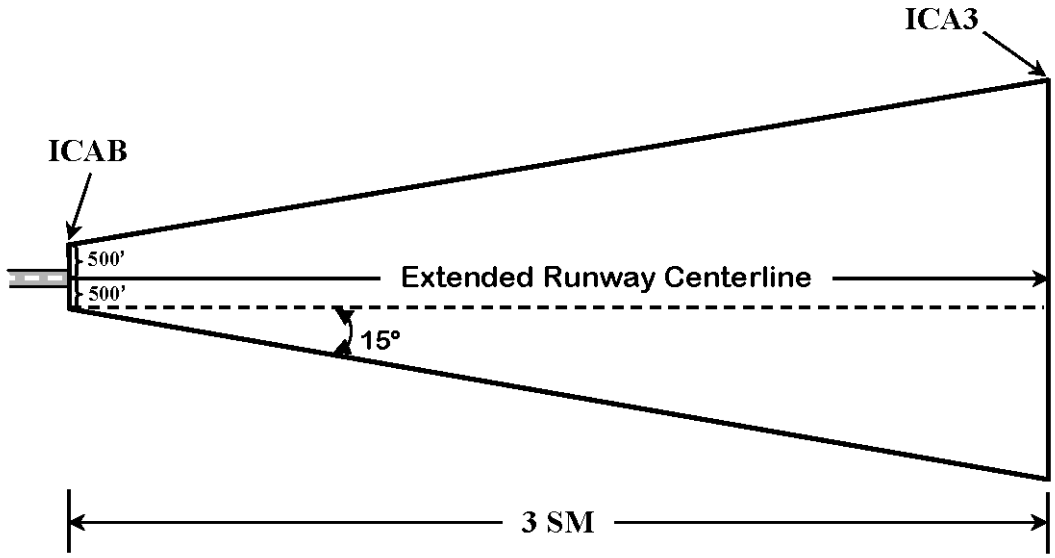
5.3.14.2. Standard Instrument Departure (SID) – a departure procedure that is developed when requested by ATC. It must include a route, provide the required obstruction clearance and shall be published graphically. Multiple SIDs may be developed and published for each runway.

5.3.14.3. ICA3 – a line 3 statute miles (SM) from the ICAB line (DER), perpendicular to the runway centerline extended.

5.3.14.4. ICA (extended) – that area between the ICAB line and the ICA3 line. The ICA (extended) origin width is 1,000 feet (± 500 perpendicular to runway centerline) wide at the DER and splays outward at a rate of 15° relative to the runway centerline extended (Figure 5.15). The ICA (extended) shall only be used to determine which one of the nine ODP cases (**paragraph** 5.3.14.6) apply.

5.3.14.5. Reduced Takeoff Runway Length (RTRL) departure procedure – A departure procedure option that limits the available takeoff runway length so that an obstacle that penetrates the 40:1 OCS by 35 feet or less can be cleared vertically by a departing aircraft at the standard climb gradient (200 ft/NM) (**paragraph** 5.3.6).

**Figure 5.15. Initial Climb Area (ICA) (extended).**




5.3.14.6. Departure Procedure Workflow. Complete a diverse departure obstacle assessment for each runway authorized for IFR operations. Coordinate diverse departure assessment results through the IFR facility manager. Classify the results of the diverse departure obstacle assessment into *one* of the nine ODP cases defined in **paragraphs** 5.3.14.6.1 through 5.3.14.6.9. **Note:** Compare calculated climb gradient (CG) values when making this determination in Cases 6, 7, 8, and 9. When the CG values inside and outside the ICA (extended) are identical, the CG *outside* the ICA (extended) shall be considered the highest CG and Cases 6 and 7 will not apply.

5.3.14.6.1. ODP Case 1 – No 40:1 OCS penetrations exist.

5.3.14.6.1.1. Do not develop or publish an ODP. Do not publish the Delta T (▼) symbol on any approach or departure procedure at that location. **Note:** A SID may be developed when required.

5.3.14.6.1.2. Document the diverse departure obstacle assessment results in a procedure package using the AF IMT 4342 and ensure it is accounted for on the AFFSA Annual Procedure Inventory as a diverse departure obstacle assessment.

5.3.14.6.2. ODP Case 2 – 40:1 OCS penetrations exist only within the ICA (extended) and all penetrations require a Climb to Altitude (CTA) of 200 feet or less above the DER; all penetrations are low, close-in obstacles.

5.3.14.6.2.1. Only develop and publish low, close-in obstacle notes (**paragraph** 5.1.8).

5.3.14.6.2.2. Send the GPD publication report containing the location of the low, close-in obstacles to flight inspection; no drawing is required.

5.3.14.6.3. ODP Case 3 – 40:1 OCS penetrations exist only within the ICA (extended) and all penetrations require a CTA greater than 200 feet above the DER;

no low, close-in obstacles. Develop and publish only *one* of the following ODP combinations:

5.3.14.6.3.1. Combination 1: A textual or graphic route or sector that avoids all 40:1 obstacle penetrations and does *not* require a climb gradient in excess of 200 ft/NM.

5.3.14.6.3.2. Combination 2:

5.3.14.6.3.2.1. A ceiling and visibility to avoid the penetrations *and*

5.3.14.6.3.2.2. Standard minimums with a climb gradient to a fix or altitude that provides appropriate obstacle clearance beyond the fix or altitude so that a standard climb gradient (200 ft/NM) can be used beyond the fix or altitude *and*

5.3.14.6.3.2.3. A note identifying the location and height of the controlling obstacle *and*

5.3.14.6.3.2.4. A reduced takeoff runway length (RTRL) departure procedure (except do not apply RTRL when any obstruction penetrates the 40:1 OCS by more than 35 feet).

5.3.14.6.3.3. Combination 3:

5.3.14.6.3.3.1. A textual or graphic route or sector that avoids some 40:1 OCS penetrations laterally and uses a climb gradient to mitigate all other 40:1 OCS penetrations vertically. The climb gradient shall provide appropriate obstacle clearance to a fix or an altitude so that the standard climb gradient (200 ft/NM) can be used beyond the fix or altitude *and*

5.3.14.6.3.3.2. A ceiling and visibility to avoid the penetrations *and*

5.3.14.6.3.3.3. Standard takeoff minimums with a climb gradient to a fix or altitude that provides appropriate obstacle clearance beyond the fix or altitude so that a standard climb gradient (200 ft/NM) can be used beyond the fix or altitude *and*

5.3.14.6.3.3.4. A note identifying the location and height of the controlling obstacle *and*

5.3.14.6.3.3.5. A reduced takeoff runway length (RTRL) departure procedure (except do not apply RTRL when any obstruction penetrates the 40:1 OCS by more than 35 feet).

5.3.14.6.4. ODP Case 4 – 40:1 OCS penetrations exist only within the ICA (extended) and has a combination of low, close-in obstacles and 40:1 OCS penetrations that require a CTA greater than 200 feet above the DER. Develop and publish low, close-in obstacle notes *and* one of the three combinations from ODP Case 3 (**paragraph** 5.3.14.6.3).

5.3.14.6.5. ODP Case 5 – 40:1 OCS penetrations only exist outside the ICA (extended); no low, close-in obstacles. Develop and publish only *one* of the following ODP combinations:

5.3.14.6.5.1. Combination 1: A textual or graphic route or sector that avoids all 40:1 obstacle penetrations and does *not* require a climb gradient in excess of 200 ft/NM.

5.3.14.6.5.2. Combination 2:

5.3.14.6.5.2.1. Standard takeoff minimums with a climb gradient to a fix or altitude that provides appropriate obstacle clearance beyond the fix or altitude so that a standard climb gradient (200 ft/NM) can be used beyond the fix or altitude *and*

5.3.14.6.5.2.2. A reduced takeoff runway length (RTRL) departure procedure (except do not apply RTRL when any obstruction penetrates the 40:1 OCS by more than 35 feet) *and*

5.3.14.6.5.2.3. A VCOA (except do not develop a VCOA when an RNAV departure procedure is being used as the ODP or when ATC will not approve the VCOA).

5.3.14.6.5.3. Combination 3:

5.3.14.6.5.3.1. A textual or graphic route or sector that avoids some 40:1 OCS penetrations laterally and uses a climb gradient to mitigate all other 40:1 OCS penetrations vertically. The climb gradient shall provide appropriate obstacle clearance to a fix or an altitude so that the standard climb gradient (200 ft/NM) can be used beyond the fix or altitude *and*

5.3.14.6.5.3.2. Standard takeoff minimums with a climb gradient to a fix or altitude that provides appropriate obstacle clearance beyond the fix or altitude so that a standard climb gradient (200 ft/NM) can be used beyond the fix or altitude *and*

5.3.14.6.5.3.3. A reduced takeoff runway length (RTRL) departure procedure (except do not apply RTRL when any obstruction penetrates the 40:1 OCS by more than 35 feet) *and*

5.3.14.6.5.3.4. A VCOA (except do not develop a VCOA when an RNAV departure procedure is being used as the ODP or when ATC will not approve the VCOA).

5.3.14.6.6. ODP Case 6 – 40:1 OCS penetrations exist both inside and outside the ICA (extended) and all 40:1 OCS penetrations require a CTA greater than 200 feet above the DER and the obstacle that requires the highest climb gradient is within the ICA (extended); no low, close-in obstacles. Develop and publish only *one* of the following combinations:

5.3.14.6.6.1. Combination 1: A textual or graphic route or sector with standard takeoff minimums that avoids all 40:1 OCS obstacle penetrations and does *not* require a climb gradient in excess of 200 ft/NM.

5.3.14.6.6.2. Combination 2:

5.3.14.6.6.2.1. Standard takeoff minimums *and* a climb gradient to clear the obstacle within the ICA (extended) to a fix or altitude that provides

appropriate obstacle clearance beyond the fix or altitude so that a standard climb gradient (200 ft/NM) can be used beyond the fix or altitude *and*

5.3.14.6.6.2.2. Provide a ceiling and visibility to see and avoid the 40:1 OCS obstacle penetrations within the ICA (extended) *and* a climb gradient to a fix or altitude to mitigate the 40:1 OCS penetrations outside the ICA (extended) *and*

5.3.14.6.6.2.3. A note identifying the location and height of the controlling obstacle *and*

5.3.14.6.6.2.4. A VCOA (except do not develop a VCOA when an RNAV departure procedure is being used as the ODP or when ATC will not approve the VCOA).

5.3.14.6.6.3. Combination 3:

5.3.14.6.6.3.1. A textual or graphic route or sector that avoids some 40:1 OCS penetrations laterally and uses a climb gradient to mitigate all other 40:1 OCS penetrations vertically. The climb gradient shall provide appropriate obstacle clearance to a fix or an altitude so that the standard climb gradient (200 ft/NM) can be used beyond the fix or altitude *and*

5.3.14.6.6.3.2. Standard takeoff minimums *and* a climb gradient to clear the obstacle within the ICA (extended) to a fix or altitude that provides appropriate obstacle clearance beyond the fix or altitude so that a standard climb gradient (200 ft/NM) can be used beyond the fix or altitude *and*

5.3.14.6.6.3.3. Provide a ceiling and visibility to see and avoid the 40:1 OCS obstacle penetrations within the ICA (extended) *and* a climb gradient to a fix or altitude to mitigate the 40:1 OCS penetrations outside the ICA (extended) *and*

5.3.14.6.6.3.4. A note identifying the location and height of the controlling obstacle *and*

5.3.14.6.6.3.5. A VCOA (except do not develop a VCOA when an RNAV departure procedure is being used as the ODP or when ATC will not approve the VCOA).

5.3.14.6.7. ODP Case 7 – 40:1 OCS penetrations exist both inside and outside the ICA (extended) and has a combination of low, close-in obstacles and 40:1 OCS penetrations that require a CTA greater than 200 feet above the DER and the obstacle that requires the highest climb gradient is within the ICA (extended). Develop and publish low, close-in obstacle notes *and* one of the three combinations from ODP Case 6 (paragraph 5.3.14.6.6).

5.3.14.6.8. ODP Case 8 – 40:1 OCS penetrations exist both inside and outside the ICA (extended) and all 40:1 OCS penetrations require a CTA greater than 200 feet above the DER and the obstacle that requires the highest climb gradient is outside the ICA (extended); no low, close-in obstacles. Develop and publish only *one* of the following combinations:

5.3.14.6.8.1. Combination 1: A textual or graphic route or sector with standard takeoff minimums that avoids all 40:1 OCS obstacle penetrations and does *not* require a climb gradient in excess of 200 ft/NM.

5.3.14.6.8.2. Combination 2:

5.3.14.6.8.2.1. Standard takeoff minimums with a climb gradient to a fix or altitude that provides appropriate obstacle clearance beyond the fix or altitude so that a standard climb gradient (200 ft/NM) can be used beyond the fix or altitude *and*

5.3.14.6.8.2.2. A reduced takeoff runway length (RTRL) departure procedure (except do not apply RTRL when any obstruction penetrates the 40:1 OCS by more than 35 feet) *and*

5.3.14.6.8.2.3. A VCOA (except do not develop a VCOA when an RNAV departure procedure is being used as the ODP or when ATC will not approve the VCOA).

5.3.14.6.8.3. Combination 3:

5.3.14.6.8.3.1. A textual or graphic route or sector that avoids some 40:1 OCS penetrations laterally and uses a climb gradient to mitigate all other 40:1 OCS penetrations vertically. The climb gradient shall provide appropriate obstacle clearance to a fix or an altitude so that the standard climb gradient (200 ft/NM) can be used beyond the fix or altitude *and*

5.3.14.6.8.3.2. Standard takeoff minimums with a climb gradient to a fix or altitude that provides appropriate obstacle clearance beyond the fix or altitude so that a standard climb gradient (200 ft/NM) can be used beyond the fix or altitude; and/or provide a ceiling and visibility to see and avoid the 40:1 OCS obstacle penetrations within the ICA (extended); and a climb gradient to a fix or altitude to mitigate the 40:1 OCS penetrations outside the ICA (extended) *and*

5.3.14.6.8.3.3. A reduced takeoff runway length (RTRL) departure procedure (except do not apply RTRL when any obstruction penetrates the 40:1 OCS by more than 35 feet) *and*

5.3.14.6.8.3.4. A VCOA (except do not develop a VCOA when an RNAV departure procedure is being used as the ODP or when ATC will not approve the VCOA).

5.3.14.6.9. ODP Case 9 – 40:1 OCS penetrations exist both inside and outside the ICA (extended) and has a combination of low, close-in obstacles and 40:1 OCS penetrations that require a CTA greater than 200 feet above DER and the obstacle that requires the highest climb gradient is outside the ICA (extended). Develop and publish low, close-in obstacle notes *and* one of the three combinations from ODP Case 8 (**paragraph** 5.3.14.6.8).

5.3.14.6.10. Perform the following actions when the diverse departure obstacle assessment result is classified as ODP Case 2 through ODP Case 9:

5.3.14.6.10.1. Develop and publish one ODP per runway. Do not develop and publish duplicate takeoff obstacle notes.

5.3.14.6.10.2. Document the diverse departure obstacle assessment results and the ODP in a procedure package with the GPD produced Publication and Build Reports.

5.3.14.6.10.3. Document the DP as a diverse departure obstacle assessment and as an ODP in the AFFSA Annual Procedure Inventory.

5.3.14.6.10.4. Process the procedure package IAW Chapter 2.

5.3.14.6.11. When the actions in **paragraphs** 5.3.14.6.2 through 5.3.14.6.9 are not feasible, a stand-alone VCOA may be developed and published (**paragraph** 5.3.13). **Note:** GPD will generate a warning that will require documenting the reason(s) why the actions are not feasible in the justification block.

5.3.14.6.12. When the actions in **paragraphs** 5.3.14.6.2 through 5.3.14.6.9 *and* a stand-alone VCOA are not feasible, IFR departures are not authorized.

5.3.15. FAA Order 8260.46, Paragraph 2-1.d. Do not consider DPs with a climb gradient as nonstandard; i.e., do not pursue waiver action for a DP that requires publication of a climb gradient.

**5.4. Special Departure Procedure (SDP) Support.** To support one engine inoperative (OEI)/Special Departure Procedure (SDP) development at fixed base locations, MAJCOMs shall establish a process to ensure all manual edits made to the OBS.txt file of each instrument procedure database for each of their locations are forwarded to the MAJCOM TERPS function. The MAJCOM TERPS function shall send these edits in a new GPD OBS.txt file to HQ AMC/A3AT (**amc.terps@us.af.mil**) NLT three days prior to the beginning of the next DVOF cycle.

# Chapter 6

## INSTRUMENT APPROACH AND ARRIVAL PROCEDURES

### *Section 6A—Supplemented Approach and Arrival Procedure Development Guidance*

**6.1. Standard Terminal Arrival (STAR).** When a requirement for a STAR exists that can't be met by the FAA, develop STARs only when feeder routes and initial approach segments will not suffice. Use the criteria in FAA Order 8260.3, Volume 1, Chapter 17, and the guidance in FAA Order 7100.9, *Standard Terminal Arrival Program and Procedures*, when developing a STAR. Use FAA Form 7100-4, *STAR-Standard Terminal Arrival*, for documenting and processing the procedure. Instructions for completing STAR documentation can be found in FAA Order 7100.9.

**6.2. Self-Contained Approach (SCA) Criteria.** SCAs are special use procedures (**paragraph** 2.11) used only by aircraft with MAJCOM-approved airborne systems. MAJCOM flying operation authorities are required to determine whether specific airborne equipment supports the ability to perform SCAs. Flight inspection is not required; however, a live flyability check (**paragraph** 4.1) is required prior to use in IMC. MAJCOM Stan/Eval approval is required prior to use and publication. SCAs shall be published in a graphic format (planview and profile). At a minimum, develop an intermediate, final, and missed approach segment IAW FAA Order 8260.3 for each SCA as follows:

6.2.1. Initial Approach Segment (as required). Apply FAA Order 8260.3, Volume 1, paragraphs 230, 231, 232, and 235 except the angle of intersection between the initial approach course and the intermediate approach course may not exceed 90°.

6.2.1.1. A satisfactory terminal area fix (FAA Order 8260.3, Volume 1, Chapter 2, Section 8) may be used in addition to the SCA fix at the initial approach fix (IAF) to facilitate use of enroute navigation systems up to the IAF.

6.2.1.2. Ensure altitudes in the initial segment are not established any lower than the MVA (with ATC RADAR) or below the MSA (without ATC RADAR).

6.2.2. Intermediate Approach Segment. Apply FAA Order 8260.3, Volume 1, paragraphs 240, 241, and 242. When an initial approach segment is not developed, altitudes in the intermediate segment shall not be below the MVA (with ATC RADAR) or below the MSA (without ATC RADAR).

6.2.3. Final Approach Segment. Comply with FAA Order 8260.3, Volume 1, Section 5, Final Approach, except:

6.2.3.1. Alignment. The final approach course shall be aligned to the extended runway centerline.

6.2.3.2. Area. The area considered for obstacle clearance begins at the final approach fix (FAF), ends at the runway threshold, and is centered on the final approach course. The minimum length is 6 NM and maximum length is 10 NM.

6.2.3.2.1. The primary area width at the runway threshold is 1.7 NM each side of the runway centerline.

6.2.3.2.2. The primary area expands uniformly to 4 NM each side of the extended runway centerline (8 NM total width) 10 NM from the runway threshold.

6.2.3.2.3. The secondary areas are zero miles wide at the runway threshold and expand uniformly to 1 NM at 10 NM from the runway threshold.

6.2.3.3. Obstacle Clearance. The minimum ROC in the primary area is 300 feet. In the secondary area, 300 feet of obstacle clearance must be provided at the inner edge, tapering uniformly to zero at the outer edge.

6.2.3.4. Descent Gradient (DG). Apply FAA Order 8260.3, Volume 1, paragraph 252, as supplemented by **paragraph** A3.24.

6.2.4. Circling Approach. Apply FAA Order 8260.3, Volume 1, Chapter 2, Section 6.

6.2.5. Missed Approach Segment. Apply FAA Order 8260.3, Volume 1, Chapter 2, Section 7.

6.2.5.1. The missed approach point is on the final approach course at the point where the aircraft has reached a specific distance from the runway threshold. It must not be farther from the FAF than the first usable portion of the landing surface.

6.2.5.2. Whenever possible, develop a missed approach that is not based exclusively upon the airborne equipment.

6.2.6. Landing Minima. Apply FAA Order 8260.3.

6.2.7. Develop single sector (360°) MSAs unless an operational requirement exists. Multiple sector MSAs must be coordinated with the requesting agency prior to implementation to ensure the users can identify multiple sectors

6.2.8. Satisfactory Fixes. All fixes must be defined by use of the airborne equipment. RNAV waypoints shall be depicted for all segments, but they shall not be used as a primary means of navigation.

6.2.8.1. Fix error for all SCA fixes is plus or minus 0.5 NM.

6.2.8.2. Annotate all named turn points and fixes associated with an SCA as RNAV waypoints (**paragraph** 1.9). Request NGA add each RNAV waypoint to DAFIF in the TAS letter. **Note:** RNAV waypoints must be included on an SCA procedure to assist aircrews in maintaining situational awareness.

6.2.8.3. Document waypoints associated with the published SCA IWA FAA Order 8260.19 and this instruction on the FAA Form 8260-2.

6.2.9. When using GPD to develop SCAs, select “ARA” under approach type. This will be modified in a future version of GPD.

6.2.9.1. Apply **paragraph** 8.2.1.8 when utilizing GPD to develop holding.

6.2.9.2. An initial segment must be developed prior to developing the holding pattern when utilizing GPD.

6.2.10. Apply Figure 6.2 when publishing recommended altitudes on final.

6.2.11. Publication. MAJCOM TERPS authority must contact MAJCOM Stan Eval to obtain a list of specific aircraft airborne equipment required to support the SCA approach.

Ensure these requirements are clearly annotated on the published plate (Example note: "**FOR USE BY AIRCRAFT EQUIPPED WITH AIRBORNE RADAR**").

6.2.12. The MAJCOM flying authority shall determine the required equipment notation to publish on the approach plate.

**6.3. Area Navigation (RNAV).** The FAA has replaced Order 8260.38, *Civil Utilization of Global Positioning System (GPS),* Order 8260.48, *Area Navigation (RNAV) Approach Construction Criteria*, and Order 8260.51, *United States Standard for Required Navigation Performance (RNP) Instrument Approach Procedure Construction*, with updated RNAV guidance in FAA Order 8260.58, *United States Standard for Performance Based navigation (PBN) Instrumrnt Procedure Design*. All RNAV instrument procedures based on criteria in these cancelled FAA orders remain valid. The USAF will continue use of RNAV criteria guidance in these cancelled FAA orders (as amended in this AFI) in GPD until GPD is replaced by the next generation automation tool. Digital copies of these cancelled orders are available from the FAA web site: **http://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.list**. MAJCOMs may, at their discretion, publish the note "**NOT FOR CIVIL USE**" on any of their RNAV procedures developed with the cancelled FAA orders. **Note:** Do not develop Localizer Performance with Vertical Guidance (LPV) procedures and do not develop approach type "RNAV Precision" using GPD until specific authorization is given by HQ AFFSA/A3A.

6.3.1. RNAV (ground-based systems, e.g., VOR/DME). Do not develop RNAV procedures based on ground-based systems. Do not apply any criteria from FAA Order 8260.3, Volume 1, Chapter 15.

6.3.2. RNAV [satellite-based systems, e.g., global positioning system (GPS)].

6.3.2.1. Develop nonprecision (stand-alone) lateral navigation (LNAV) IAW FAA Order 8260.38, and terminal arrival areas (TAA) IAW FAA Order 8260.45, *Terminal Arrival Area (TAA) Design Criteria*). Intermediate segment lengths for stand-alone LNAV procedures will be determined IAW FAA Order 8260.3, Volume I, paragraph 242.b.(1) and Table 3. Use GPD to develop all supported procedure segments. **Note:** GPD builds the following missed approach types; straight to fix, turn to fix and a climb to altitude missed approach to which holding can be added.

6.3.2.2. The AF takes exception to FAA Order 8260.38, paragraphs 11a and 12a. For AF procedures, course changes at the intermediate waypoint (IWP) shall not exceed 90°. Course changes at the final approach waypoint (FAWP) shall not exceed 15°. **Note:** The waypoints indicating the Intermediate Fix (IF) and the Final Approach Fix (FAF) shall be charted IAW DOD publication specifications.

6.3.2.3. The AF takes exception to FAA Order 8260.38, paragraph 14, MISSED APPROACH SEGMENT. Except as stated in this AFI, use the criteria in paragraph 14 in conjunction with FAA Order 8260.48. Rescind the "Route" portion of missed approach contained within FAA Order 8260.38. Utilize a "Direct" turning missed approach developed IAW FAA Order 8260.38 with the following restrictions:

6.3.2.3.1. The turn must commence at the MAP (i.e., the combination straight and turning missed approach is not authorized).

6.3.2.3.2. The missed approach procedure is limited to one turn.

6.3.2.4. The AF takes exception to FAA Order 8260.38, paragraph 16, STRAIGHT MISSED APPROACH. Straight missed approach criteria are applied when the missed approach course does not differ more than 15° from the final approach course. Secondary areas are not permitted within the ICA.

6.3.2.5. The AF takes exception to FAA Order 8260.38, paragraph 17, TURNING MISSED APPROACH. Turning missed approach criteria apply whenever the missed approach course differs by more than 15° from the final approach course. Establish a fly-by (FB) or a fly-over (FO) turning waypoint (TWP) to identify the point at which the turn commences, followed by a TF leg segment. Construct the ICA of a turning missed approach in the same manner as straight missed approach and shall be a continuation of the final approach course (±15°).

6.3.2.6. When developing LNAV/VNAV procedures, use the LNAV VNAV TEMP Spreadsheet (available on the HQ AFFSA Airfield Operations website at **https://cs1.eis.af.mil/sites/AFFSA/A3A/SitePages/Home.aspx**) to calculate the lowest usable temperature for entry into the Summary Tab of the Approach Procedures dialog window.

6.3.2.7. The USAF does not conduct DME/DME screening modeling to determine the adequacy of DME signal reception to support RNAV instrument approach procedures. Therefore, a chart note is required to indicate a DME/DME solution is not authorized. Ensure all current and future USAF RNAV instrument approach procedures have the following note charted: **DME/DME RNP – 0.3 NA**.

6.3.2.8. When designing RNAV procedures, use Table 6.1 to determine whether the waypoint is to be designed as a Fly-by (FB) waypoint or as a Fly-over (FO) waypoint. EXCEPTION: The IAWP may be designed as a FO waypoint *only when preceded by a feeder route*. Applying this exception will result in a GPD violation; use this paragraph as justification for the violation. **Note:** All stepdown fixes are along track distances and are charted as FB fixes in the planview.

**Table 6.1. Waypoint Design Standard (see Note).**

| Waypoint (WP) | Fly-by (FB) Mandatory | Fly-over (FO) Mandatory |
|---|---|---|
| IAWP | X | |
| IWP | X | |
| FAWP | X | |
| MAWP | | X |
| MAHWP (see Note) | | X |
| FTP WP (offset procedures) | | X |

**Note:** The missed approach holding waypoint (MAHWP) will always be designed as a FO waypoint. When it is used for multiple purposes on the same plate, e.g., the IAWP and the MAHWP, it will be coded as a FO WP *but charted* as a FB WP in the planview. Ensure these coding and charting requirements are correctly articulated in any required coordination (TAS letter, etc).

6.3.2.9. Apply FAA Order 8260.19, paragraph 8-56.d.(9) to AF developed RNAV missed approach instructions.

6.3.2.10. When publishing LNAV minima in conjunction with LNAV/VNAV minima, identify the location of the VDP by the NM distance to the threshold. Indicate the VDP as applicable to the LNAV only and ensure "**LNAV only"** is published on the approach plate. **Note:** When required due to space limitations in the profile view, NGA will identify the procedure to which the VDP applies with an asterisk (*) or other symbol.

**6.4. Point in Space (PINS) Procedures.** Establish a minimum descent altitude (MDA) or decision altitude (DA) of 500 feet or higher above ground level (AGL) for procedures that do not provide for landing. Except for helicopter point in space procedures, these are special use instrument procedures and require annotation per **paragraph** 2.11. Additionally, apply **paragraph** 1.13 Visual Flight Rules (VFR) Procedures, to PINS procedures when all appropriate instrument procedure criteria has not been applied. Calculate recommended altitudes manually IAW **paragraph** 6.8.2 except use the FAF to missed approach point (MAP) distance and the MDA.

**6.5. Publishing ILS Restrictions.** Permanent, flight inspected restrictions to ILS facilities, as documented in the flight inspection report, shall be published in the planview of DOD FLIP (Terminal) as a caution note(s) and as requested by flight inspection. Inform all other signatories on the procedure of these restrictions. Examples: "**CAUTION: ILS GS unusable below 3100 MSL**", or "**CAUTION: Autopilot coupled operations NA past DA**." Process any new restrictions from the flight inspection as procedural changes.

**6.6. Publishing More than One Instrument Procedure on a Single Chart in the DOD FLIP (Terminal).** Combining non-RNAV instrument approach procedures for publication on a single chart is accomplished as a cartographic function by NGA during their publication process and shall be limited to the conditions of this paragraph. When excessive chart clutter results, de-combine and publish the two IFPs separately.

6.6.1. VOR/DME and VOR procedures and VOR/DME and TACAN procedures predicated on VORTAC facilities may be combined by NGA for publishing on a single chart. Ensure the following when sending the IFPs referred to in this paragraph to NGA for publication on a single chart:

6.6.1.1. Each IFP must be developed as a stand-alone procedure;

6.6.1.2. Each IFP must be sent to flight inspection as a stand-alone procedure;

6.6.1.3. The published final and missed approach courses are identical;

6.6.1.3.1. The FAF location and altitude, any stepdown fix(es) and altitude(s), and the VDPs must be identical.

6.6.1.3.2. Missed approach instructions must be identical.

6.6.1.4. Include instructions for NGA to combine the procedures on a single chart.

6.6.2. ILS and localizer procedures may be developed in GPD as a combined instrument procedure prior to flight inspection and publishing. Ensure the localizer box is checked so that both the localizer and the ILS are built in GPD simultaneously.

6.6.2.1. A single package with both procedures documented is sent to flight inspection and then to NGA for publication.

6.6.2.2. Whenever a VDP is published for the localizer procedure on any ILS procedure, indicate the VDP is for localizer use only by ensuring "**LOC only"** is published on the approach plate. **Note:** When required due to space limitations in the profile view, NGA will identify the procedure to which the VDP applies with an asterisk (*) or other symbol.

6.6.3. Apply FAA Order 8260.19, paragraph 8-52.d.(1) to AF developed ILS and MLS instrument procedures published with non-vertically guided procedures (localizer or azimuth) that are published on the same approach chart and require a stepdown fix in the final segment. Also apply this guidance to RNAV (GPS) charts without vertical guidance that contain LNAV/VNAV minima when the stepdown fix restriction applies only to the LNAV line of minima.

6.6.3.1. Fix altitudes published on the profile view of an ILS, RNAV, or MLS procedure between the FAF/PFAF and the runway threshold, i.e., stepdown fixes, are to be applied to the non-vertically guided (localizer, LNAV, or azimuth) procedure only. **Note:** For RNAV stepdown fixes published in conjunction with vertically-guided minimums, the published altitude at the fix must be equal to or less than the computed glidepath altitude at the fix.

6.6.3.2. Ensure the following is applied to all applicable ILS, RNAV, and MLS procedures: annotate the stepdown fix altitude with "**LOC only**", "**LNAV Only**", or "**AZ only**", as applicable, in the profile view.

**6.7. Sidestep Maneuver (SSM) Procedures.** Apply FAA Order 8260.19, paragraph 4-6, and this paragraph. A SSM is a procedure where the final approach is aligned to one runway (referred to as the approach runway), and a visual maneuver is made to land on a parallel runway (referred to as the sidestep runway). A SSM to an adjacent runway that is not parallel to the approach runway is nonstandard and requires waiver. Publish SSM procedures only under the following conditions:

6.7.1. Depict only one final approach course (to the approach runway) on the planview.

6.7.2. The same nonprecision final approach area (appropriate to the final approach guidance) is evaluated for both the approach and sidestep runways. When publishing SSM minima in conjunction with an ILS approach, use a localizer final approach trapezoid to establish the SSM MDA.

6.7.2.1. When designing the sidestep runway final approach area in GPD, place an appropriate pseudo NAVAID abeam the approach runway NAVAID and on the sidestep runway centerline (or when applicable, the sidestep runway extended runway centerline).

6.7.2.2. The appropriate final approach area of the sidestep runway must be aligned with the sidestep runway centerline extended; orientation of the sidestep runway final approach area trapezoid shall match the orientation of the approach runway final approach area trapezoid for both on-airport and off-airport facilities.

6.7.2.3. Establish the sidestep runway FAF on the sidestep runway centerline extended abeam the approach runway FAF. The area considered for obstacle clearance in the sidestep final starts at the sidestep runway FAF and continues towards the sidestep runway threshold.

6.7.2.4. Establish a VDP to determine the length of the visual portion of the final approach segment on the sidestep runway. **Note:** Do not publish a VDP for the sidestep runway.

6.7.2.5. The same nonprecision obstacle clearance used for the approach runway shall be used to determine the nonprecision MDA for the sidestep runway. The published sidestep MDA shall be equal to or higher than the MDA for the approach runway.

6.7.3. Calculate visibility minima as follows:

6.7.3.1. Use the sidestep HATh when calculating visibility values. The sidestep runway MDA minus sidestep runway threshold elevation equals the sidestep runway HATh.

6.7.3.2. When the distance between the approach runway FAF and sidestep runway threshold is less than the minimum no-light visibility for a particular aircraft approach category, do not authorize a SSM for that approach category. **Note:** Application of this restriction will provide sufficient visibility to acquire and maneuver to the sidestep runway.

6.7.4. When the descent gradient exceeds 400 ft/NM to either the approach runway or to the sidestep runway, the SSM is nonstandard and requires waiver. Apply FAA Order 8260.3, paragraph 252 to the sidestep runway except the gradient is based on:

6.7.4.1. The distance from the approach runway FAF (or last stepdown fix) to the sidestep runway threshold

6.7.4.2. The height difference between the minimum altitude at the approach runway FAF (or last stepdown fix) and the threshold elevation of the sidestep runway

6.7.5. Minima are published as shown in the sample in Figure 6.1. Assuming runways 27L and 27R, with an ILS approach published to runway 27L, identify the procedure as **ILS or LOC RWY 27L**.

**Figure 6.1. Sample Sidestep Minima (with credit for lights) Publication and Associated 'ALS inop'.**

| CATEGORY | A | B | C | D | E |
|---|---|---|---|---|---|
| S-ILS 27L* | 1621 / 24 200 (200-½) | | 1651 / 24 230 (300-½) | | |
| S-LOC 27L** | 1820 / 24 399 (400-½) | | 1820 / 40 399 (400-¾) | | 1820 / 50 399 (400-1) |
| SIDESTEP 27R*** | 1840 / 50 419 (400-1) | | | | 1840 - 1½ 419 (500-1½) |
| CIRCLING | 1920-1 492 (500-1) | | 1920-1½ 492 (500-1½) | 1980-2 552 (600-2) | |

* When ALS inop, increase RVR to 50, vis to 1 mile

** When ALS inop, increase CAT AB RVR to 50, vis to 1 mile; CAT CD RVR to 60, vis to 1¼ mile; CAT E vis to 1½ miles

*** When ALS inop, increase CAT ABCD vis to 1½ miles; CAT E vis to 2 miles

6.7.6. Develop and submit only one procedure package to flight inspection (with one signature page) that includes the publication report for the sidestep maneuver procedure. Justify segment violations, other than final approach segment, with the following notation: "NA; SSM."

**Notes:**

1. Flight inspection will treat the SSM like another set of minima and a ground track to check as a part of the normal instrument procedure.

2. Additional coordination of this procedure shall be IAW Chapter 2.

3. The AF IMT 4343 date-time stamp will not match the date-time stamp of the sidestep procedure build.

**6.8. Airport Surveillance Radar (ASR) Approach Procedures.** Apply FAA Order 8260.3, Volume 1, paragraph 252 when determining the appropriate ASR approach descent gradient (DG) and FAF altitude. Do not publish TCH, descent angle, or descent gradient for ASR approach procedures.

6.8.1. At Radar Final Control (RFC) locations without ASR scope availability, surveillance approaches using PAR azimuth may be developed using localizer criteria (FAA Order 8260.3, Volume 1, Chapter 9). This will permit use of GPD for procedure development. Recommended altitudes must be computed manually.

6.8.1.1. The FAF and final approach segment length are defined as a distance from the PAR touchdown point (or RPI).

6.8.1.2. Use the FAF to threshold distance and the TCH (MSL value) when calculating the recommended altitudes for straight-in approaches. When there is no VGSI for the runway, select an appropriate TCH from FAA Order 8260.3, Volume 3, Table 2-3.

6.8.2. Establish recommended altitudes for each mile on final between the FAF and the MAP, but not below the MDA. Round each recommended altitude to the nearest 20-foot increment. When requested or required by host nation authorities, round each recommended altitude to the nearest 100-foot increment. Given the following conditions: FAF 7.8 miles from threshold; minimum altitude at FAF is 9000; minimum altitude at 3 mile stepdown fix is 7300; TCH Elevation (MSL) is 6172; and MDA is 6580, use Figure 6.2 as an example for calculating the recommended altitudes. **Note:** Recommended altitudes are **bolded**.

**Figure 6.2. Sample Recommended Altitude Calculations.**

9000 – 7300 = 1700. 1700 ÷ 4.8 = 354. DG = 354 ft/NM from FAF to stepdown fix

7300 – 6172 = 1128. 1128 ÷ 3 = 376. DG = 376 ft/NM from stepdown fix to THR

Since the gradient between the stepdown fix and the THR is greater than the gradient between the FAF and the stepdown fix, continue the greater gradient out to the FAF and adjust the minimum altitude at the FAF upward.

*4.8 × 376 = 1804.8*

| | |
|---|---|
| 7300 + 1804.8 = 9104.8 | 9100 (Adjusted FAF altitude) |

*(0.80 × 376 = 300. Altitude lost between the FAF and 7 miles)*

| | |
|---|---|
| 9104 – 300 = 8804 at **7 miles** | **8800** |
| 8804 – 376 = 8428 at **6 miles** | **8420** |
| 8428 – 376 = 8052 at **5 miles** | **8060** |
| 8052 – 376 = 7676 at **4 miles** | **7680** |
| 7676 – 376 = 7300 at **3 miles** | **7300** (Stepdown Fix) |
| 7300 – 376 = 6924 at **2 miles** | **6920** |
| 6924 – 376 = 6548 at 1 mile | 6540 (Not Used - Below MDA) |
| 6548 – 376 = 6172 at THR | 6172 (TCH) |

**6.9. Best Fit Straight Line (BFSL) Application to Threshold Crossing Height (TCH).** Do not use flight inspection derived BFSL RDH data in IFP development.

**6.10. Category I Microwave Landing System (MLS).** Develop MLS and Mobile Microwave Landing System (MMLS) procedures using criteria in **paragraph** 6.11 and the criteria in FAA Order 8260.3, Volume 3.

**6.11. Mobile Microwave Landing System (MMLS).** The minimum glide slope angle is 3.00°, and maximum authorized glide slope angle is 3.60°. Angles beyond these paramiters are nonstandard and require waiver.

6.11.1. System Components. The system components are considered to be the MMLS Azimuth, Elevation, and DME. An additional conventional NAVAID may be used to conduct the instrument procedure i.e., missed approach or initial segment; however it will not be considered a system component. The MMLS does not provide back course azimuth. Course guidance used beyond the MAP shall be based on another source. **Note:** The three

letter DME source shall not be identical to any other on field NAVAIDS, e.g., local TACAN is “RMS”; do not use “RMS” as the MLS identification.

6.11.2. The following definitions apply:

6.11.2.1. MMLS Datum Point. A point on runway centerline, 90° abeam the MMLS elevation station (same as runway crown point for ILS procedures).

6.11.2.2. Elevation Antenna Emplacement Point.

6.11.2.2.1. Assault strip. Elevation station located approximately 156 feet either side of centerline for a collocated site (up to 450 feet for a split-site configuration).

6.11.2.2.2. All other landing areas. Elevation station located approximately 250 to 306 feet either side of centerline for a collocated site (up to 450 feet for a split-site configuration).

6.11.2.3. Service Limitation. The azimuth service limitation is 15 miles from the facility, within ± 40° of the center course (Figure 6.3). The elevation service limitation is 15 miles from the facility and from 2.5° to 15°.

6.11.2.4. Minimum Azimuth Coverage. See FAA Order 8200.1, Chapter 16, Section 220 for minimum azimuth coverage requirements.

6.11.3. MMLS Approach Minimums.

6.11.3.1. MMLS Category I is defined as a precision approach (PA) procedure with a DA of not less than 200 feet above runway threshold.

6.11.3.2. ‘Azimuth Only’ are approach procedures that do not use the elevation components of the MMLS. When calculating azimuth only minima, apply FAA Order 8260.3, Volume 1, Chapter 9.

6.11.3.2.1. When automating the azimuth only portion in GPD, create a false runway at the airport that matches the current runway that the MMLS approach is being designed to. For example, create RWY 05L since RWY 05 already exists.

6.11.3.2.2. Then create an MMLS in split site configuration (create a false localizer) for the false runway. Once this false runway and MMLS have been created, an azimuth only procedure can be designed. GPD only allows one localizer per runway; there is no other way to automate the procedure without the false localizer.

6.11.3.2.3. The azimuth procedure can then be used in conjunction with the precision portion of the MMLS approach giving precision, nonprecision and circling minima on the same approach plate.

6.11.3.3. When calculating circling minima, apply FAA Order 8260.3.

6.11.3.4. Computed MMLS. A collocated azimuth and elevation antenna site that provides guidance along the extended runway centerline to account for offset installation of the azimuth antenna. MMLS DME information is derived from an antenna located on top of the azimuth antenna. Use of external DME source (TACAN or VOR/DME) is not authorized except as noted in **paragraph** 6.11.5. Computed MMLS requires special aircraft avionics and may not support normal civil operations.

6.11.4. Fixes. All fixes established within the MMLS coverage area shall be based on MMLS DME. Additionally, the following criteria applies:

6.11.4.1. MMLS DME fix error is 0.5 miles.

6.11.4.2. Published MMLS fix distances shall be specified to the nearest tenth of a mile.

6.11.4.3. Establish the PFAF by MMLS DME and publish the distance from the DME antenna.

6.11.5. Inoperative System Components.

6.11.5.1. At collocated sites, a failure of any component (azimuth, elevation, or DME) will render the procedure unusable. Failure of one antenna will result in aircraft receiver course and glide slope off or warning flags and loss of course information.

6.11.5.2. DME Failure. For split-site locations, when the MMLS DME transmitter is inoperative, another means may be employed to determine position along the approach course such as DME from a TACAN or VOR/DME. **Note:** When this option is exercised, ensure the appropriate obstacle search areas are evaluated (different fix error involved in identifying a PFAF from another NAVAID or via radar).

6.11.6. On assault landing strips or zones, the MMLS will be sited to provide touchdown 300 to 500 feet from threshold. Because of this limitation, the TCH and WCH may be less than normally authorized for a specific aircraft height group. When developing MMLS procedures supporting landing strips or landing zones, the minimum TCH is 30 feet regardless of aircraft height group. A TCH of less than 30 feet or greater than 60 feet is nonstandard and requires waiver processing. WCH violations do not require waiver action. These procedures are classified special use. Apply notation requirements IAW paragraphs 2.11 and A3.43. **Note:** approach minima below circling may be restricted. Updated guidance (AF Engineering Technical Letter 09-6) may be obtained from the AFCEC publications manager at Tyndall AFB, FL via **http://www.wbdg.org/ccb/browse_cat.php?=125**.

6.11.7. Threshold Crossing Height (TCH). TCH will vary based on deployment configuration and system siting requirements. The optimum threshold crossing height is 50 but VGSI coincidence should be a primary consideration. Except as specified in paragraph 6.11.6, FAA Order 8260.3, Volume 3, paragraph 2.6 and Table 2-3 applies.

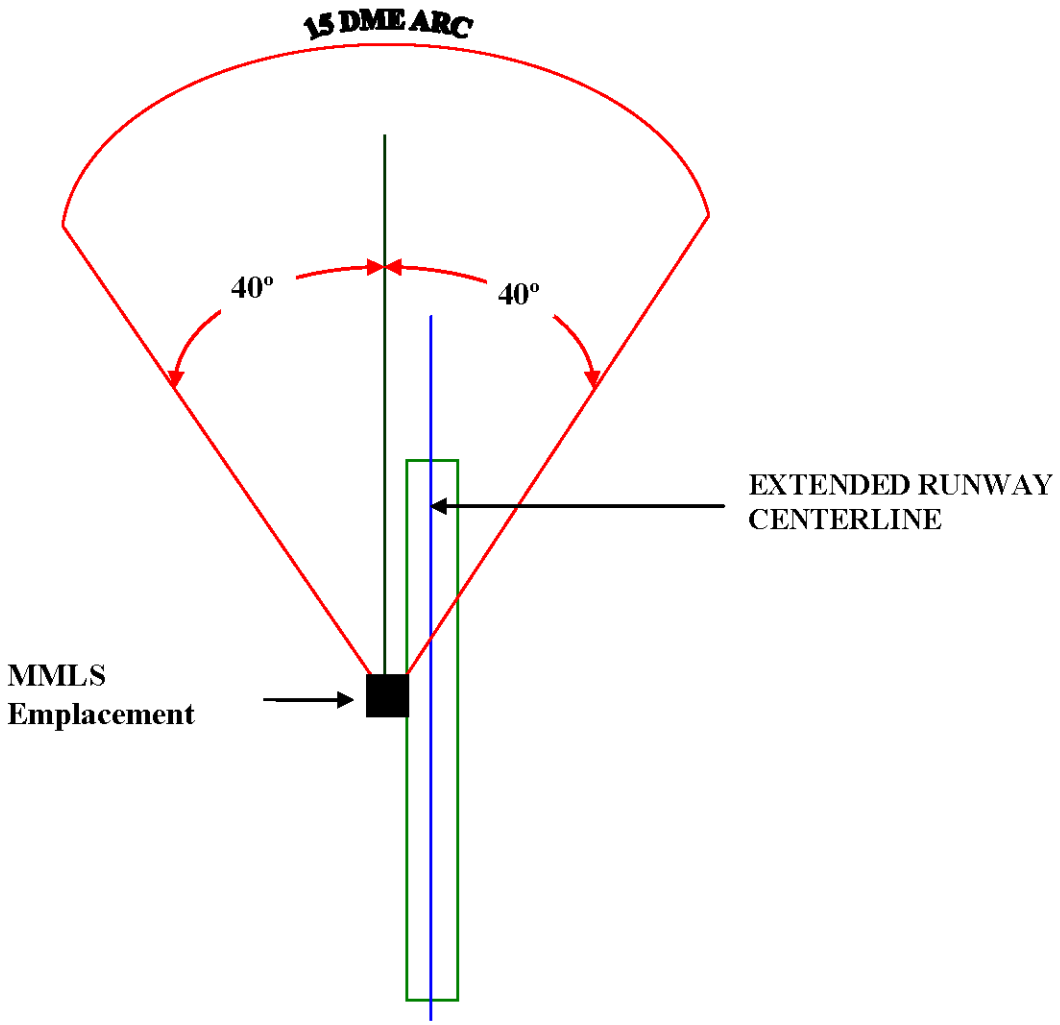
6.11.8. Procedure Design Limitations. Development of MMLS procedures shall be independent of existing procedures.

6.11.8.1. Only straight-in procedures are authorized; curved or angled procedures are not permitted.

6.11.8.2. The intermediate segment azimuth shall be a straight extension of the final approach course.

6.11.9. Missed Approach. Do not use MMLS for missed approach course guidance. MMLS DME can be used in the missed approach segment not to exceed the service volume. Annotate the procedure IAW paragraph A3.10 when radar is used for the missed approach.

**Figure 6.3. Operational Limits of MMLS (drawing not to scale).**




***Section 6B—Instructions for Additional TERPS IMTs***

**6.12. AF IMT 3642, *Circling Computations*.** Complete this IMT when documenting AF instrument approach procedures not automated by GPD to determine circling minimums based on obstacle clearance or height above airport (HAA). Include the airport name and names of instrument procedures applicable to specific circling computations in block provided.

# Chapter 7

## NATO/PANS-OPS CRITERIA

**7.1. Implementation Requirements.** When directed by the host nation, and only after the MAJCOM TERPS staff has determined a sufficient number of personnel are trained in ICAO PANS-OPS standards and design methods, implement NATO/PANS-OPS criteria (**paragraph** 7.2.2) at all OCONUS locations where the host nation operates the airfield and the AF has instrument procedure responsibility. At US operated locations OCONUS, do not implement this criteria (i.e., continue using US TERPS criteria) until it is determined by AF airfield authorities that the airfield meets ICAO Annex 14 airfield design criteria or that the airfield design can support ICAO PANS-OPS instrument procedure design.

**7.2. Definitions.**

7.2.1. ICAO PANS-OPS. References to ICAO PANS-OPS apply to the standards defined in ICAO Document 8168-OPS/611, *Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) Volume II, Construction of Visual and Instrument Flight Procedures*. This criteria is applied when selecting the "ICAO" button in GPD.

7.2.2. NATO/PANS-OPS. Allied Air Traffic Control Publication-1 (AATCP-1) is the NATO supplement to ICAO Document 8168-OPS/611, Volume II. NATO/PANS-OPS refers to the instrument procedure criteria in AATCP-1 and includes instrument procedure criteria applicable to military aircraft. This criteria is applied when selecting the "NATO" button in GPD.

**7.3. Application.** Mixing US TERPS and any other criteria at the same location is only authorized when GPD software does not have the capability to develop an IFP type using NATO/PANS-OPS criteria. Inform the host nation when using US TERPS criteria at locations where the host nation operates the airfield and the AF has instrument procedure responsibility.

7.3.1. When a waiver is required due to criteria deviations, specify in the waiver request the applicable document and paragraph to be waived. Examples: "PANS-OPS, Volume II, Part III, paragraph 5.6", or "AATCP-1, paragraph 414.d.1," etc.

7.3.2. When a specific requirement exists for a type of instrument procedure that is not addressed in this chapter, AATCP-1, or in ICAO PANS-OPS, use FAA Order 8260.3 as supplemented by AFI 11-230.

7.3.3. Except when limited by GPD (**paragraph** 7.3), apply a single criteria or standard to all IFPs at a single location. Ensure that procedure packages, the Attachment 6 checklist, and FTIP review letters clearly identify which standard has been applied. Consider the following when determining which standard to apply:

7.3.3.1. Is the host nation using standard ICAO PANS-OPS, or some variation consistent with the ICAO philosophy?

7.3.3.2. Has the AF instrument procedure designer responsible for the location been formally trained in ICAO instrument procedure design methods?

7.3.3.3. Does GPD support the type of procedure(s) to be reviewed or designed?

7.3.4. Use of AATCP-1. The following items supplement AATCP-1:

7.3.4.1. Chapter 1. Administrative. The USAF may act as the National Authority.

7.3.4.2. Chapter 2. Supplemented PANS-OPS Criteria.

7.3.4.2.1. Paragraph 204.a.1. Publish descent angles to the nearest one-tenth of a degree.

7.3.4.2.2. Paragraphs 205, 206 and 211 are not applicable. The AF has not established requirements for helicopter procedures IAW ICAO standards. Paragraph 204.a.1. – publish descent angles to the nearest one-tenth of a degree.

7.3.4.2.3. Paragraph 209. Not applicable, except for 209.a.

7.3.4.2.4. Paragraph 239. Not applicable.

7.3.4.3. Chapter 3. Additional Military Criteria – Takeoff and Landing Minima.

7.3.4.3.1. When a stepdown fix is included in the final segment, minimums with, and without the stepdown fix shall be provided unless DME is required to fly the final segment.

7.3.4.3.2. Paragraph 318, Safe Altitude 100 NM. The Safe Altitude 100 NM shall be charted IAW DOD publication specifications for Emergency Safe Altitude (ESA). The Safe Altitude 100 NM center point for an RNAV approach shall be the Missed Approach Waypoint (MAWP).

7.3.4.4. Chapter 5. Additional Military Criteria – High Performance Military Aircraft. Not applicable.

7.3.4.5. Chapter 6. Additional Military Criteria – Precision Approach Radar (PAR). Not applicable. For PAR final and missed approach segments, use AF TERPS criteria. For the remaining segments associated with PAR procedures, use ICAO PANS-OPS or AATCP-1.

7.3.4.6. Chapter 8. Additional Military Criteria – Helicopters. Not applicable. The AF has not established requirements for helicopter procedures IAW ICAO standards.

7.3.4.7. Chapter 9. Additional Military Criteria – Departures. Paragraph 901.d. Apply VCOA wording from paragraph 5.3.13.3.4.

7.3.5. Use of ICAO PANS-OPS. The following items supplement ICAO PANS-OPS:

7.3.5.1. Part I. General.

7.3.5.1.1. Section 2, Chapter 1, paragraph 1.7, Increased Altitudes/Heights for Mountainous Terrain. In addition, add 600 meters (or 2000 feet when non-SI units (feet) are used) to holding, MSA and ESA segments.

7.3.5.1.2. Section 2, Chapter 2. VOR accuracies also apply to TACAN facilities.

7.3.5.1.3. Section 3, Chapter 2, paragraph 2.6, Obstacle Identification Surface (OIS). Within GPD, the OIS origin begins at a height equivalent to the DER elevation. The origin height may be raised as high as 16 feet (or as high as what the host publishes) above the DER to eliminate penetrations to the OIS. When the host publishes a screen height other than 5 meters (16 feet), evaluate the departure using the host

published screen height. Establishing an origin height at an altitude greater than 16 feet requires host nation approval. Whenever the origin height is raised above the DER elevation, publish a DER crossing height on the procedure.

7.3.5.1.4. Section 3, Chapter 4, paragraph 4.3.1, Turn Initiation Area OIS. Apply paragraph 7.3.5.1.3.

7.3.5.1.5. Section 4, Chapter 3, paragraph 3.2.1. The altitude at the initial approach fix shall be rounded to the nearest 50-meter increment (nearest 100-foot increment when non-SI units (feet) are used).

7.3.5.1.6. Section 4, Chapter 3, Appendix A, Initial Approach Using Dead Reckoning (DR), Paragraph 3.1.2 a), First leg of the initial approach. When developing an S-type dead reckoning initial approach, the angle between the leg prior to the dead reckoning leg and the dead reckoning leg (at the start fix) shall not exceed 68°. **Note:** A 68° turn at the start fix corresponds with an inner edge that is 90° to the straight leg prior to the dead reckoning leg.

7.3.5.1.7. Section 4, Chapter 5, paragraph 5.4.5.3.1, Remote Altimeter Setting. Not Applicable. Use AATCP-1, paragraph 233.

7.3.5.2. Part II. Conventional Procedures.

7.3.5.2.1. Section 1, Chapter 3, MLS. Not applicable. Use AF TERPS criteria.

7.3.5.2.2. Section 1, Chapter 5, PAR. Not Applicable. For PAR final and missed approach segments, use AF TERPS criteria. For the remaining segments associated with PAR procedures, use ICAO PANS-OPS or AATCP-1.

7.3.5.2.3. Section 2, Chapter 4, VOR or NDB with FAF. This chapter also applies to TACAN procedures. **Note:** See AATCP-1, Chapter 4 for additional TACAN guidance.

7.3.6. Criteria in addition to AATCP-1 and ICAO PANS-OPS.

7.3.6.1. Unless otherwise stated in ICAO PANS-OPS, the rise in secondary obstacle clearance surfaces is measured perpendicular to the nominal flight track.

7.3.6.2. For construction of CAT II and CAT III procedures, manually enter an obstacle that represents taxiing aircraft, holding bays, or taxiway holding positions.

**7.4. Use of Automation.** When required to use automation for FTIP review (Chapter 3) or when designing instrument procedures IAW NATO/PANS-OPS, use the GPD automation software to the maximum extent possible. Use of GPD is mandatory when required to review or design precision final approach segments IAW NATO/PANS-OPS. **Note:** Except for precision final segments, when GPD does not support a particular segment type or procedure to be reviewed or designed, manual methods for instrument procedure design and review is authorized.

## Part 3

## INSTRUMENT PROCEDURE AUTOMATION

# Chapter 8

## USAF GLOBAL PROCEDURE DESIGNER (GPD)

**8.1. Instrument Procedure Software.** USAF Global Procedure Designer (GPD) is the only software authorized for use when designing, reviewing, or maintaining IFPs and ATC charts. TERPS functions with responsibility for developing, publishing, and maintaining instrument procedures or ATC charts shall install and use the most current version of GPD as directed by AFFSA. AFFSA recommends all users back-up GPD at least monthly and retain at a minimum the most recent back-up on an approved medium external to the GPD computer. Use a network shared drive, a digital video disc or a currently approved, portable, external hard drive to store the back-up files. MAJCOMs should establish the process for maintaining the required back-up files in a MAJCOM Operating Instruction (OI) or in the MAJCOM supplement to this AFI.

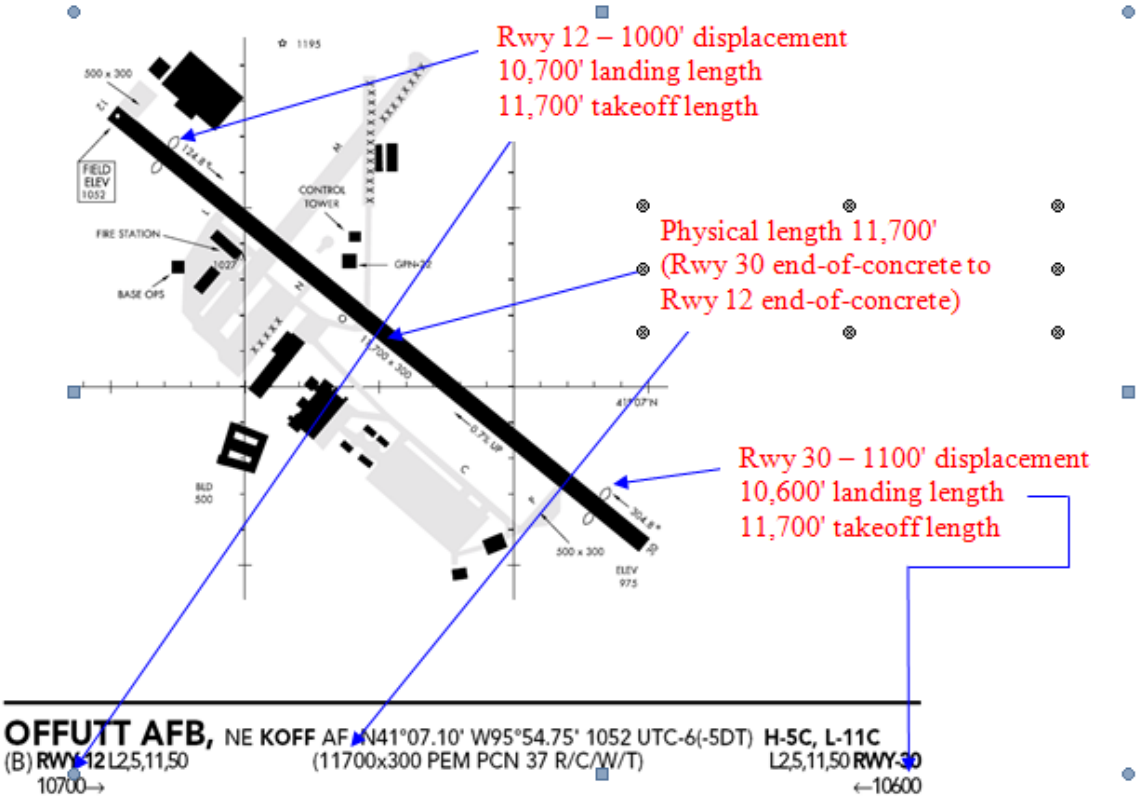
**8.2. Standard GPD Workflow.** Follow the workflow outlined in the GPD Operating Manual, Volume 1, Table 2-1. Certain critical steps are explained as follows (**CAUTION:** Failure to follow the workflow sequence as described in Table 2-1 may result in loss of data);

8.2.1. Evaluate accuracy and reconcile aeronautical data discrepancies. All data imported from DAFIF shall be verified against source to confirm correctness. Some values required for TERPS analysis are not contained in DAFIF and must be added as supplementary data. Add supplementary data as required. Ensure all coordinates entered into GPD are stated in the WGS-84 datum; convert when necessary. GPD will output Quality Reports that are intended to assist in aeronautical data resolution; maintaining hard copies of these documents is not required. The following data must be resolved in Data Manager prior to procedure development:

8.2.1.1. Aerodrome assigned (magnetic) variation.

8.2.1.2. Runway Physical, Landing, Takeoff and Displacement lengths (Figure 8.1 and Figure 8.2). **Note:** Figure 8.1 is a representation of where certain source data is displayed on the AIRPORT DIAGRAM in the DOD FLIP (Terminal) and is meant to be used in conjunction with Figure 8.2 to illustrate where general runway data are entered into GPD. Do not consider the data displayed on the AIRPORT DIAGRAM in the DOD FLIP (Terminal) source data.

**Figure 8.1. Runway Physical, Landing, Takeoff and Displacement Lengths.**



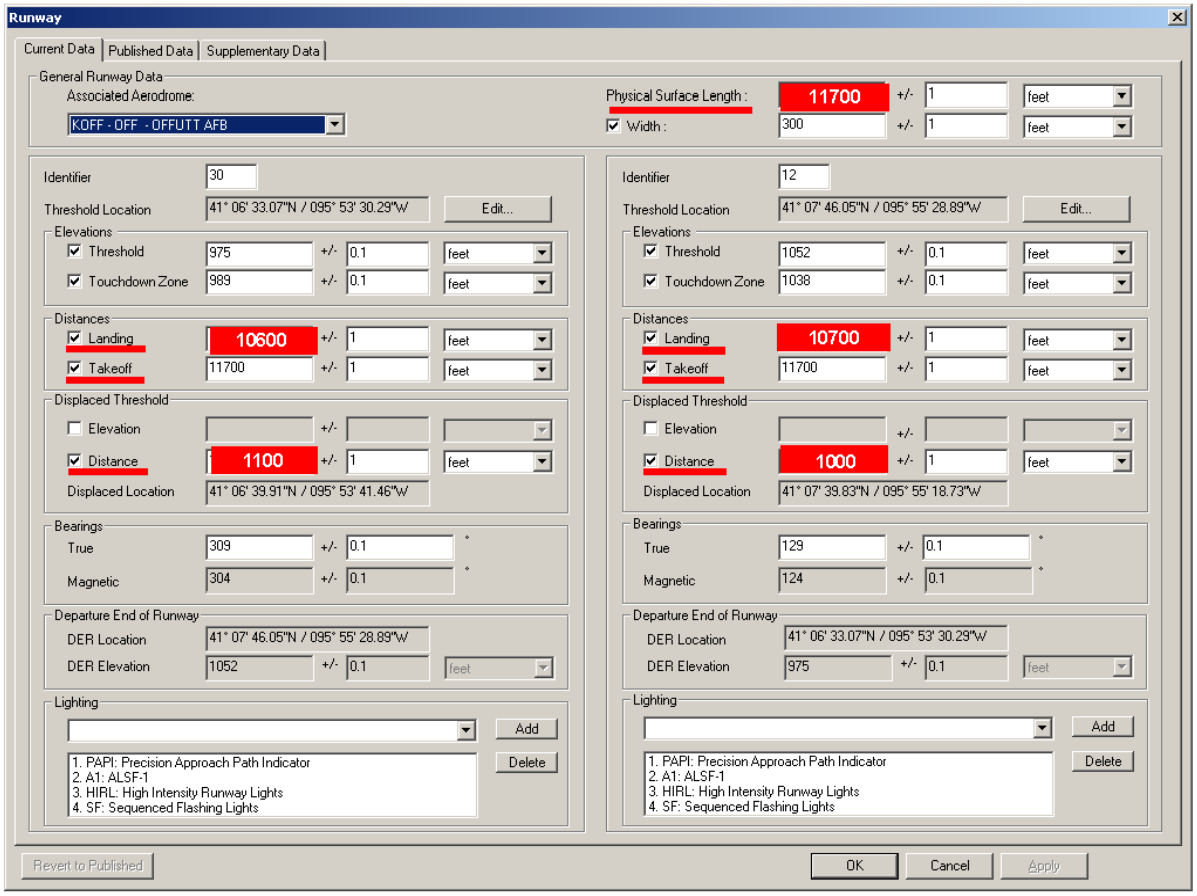

8.2.1.3. Supplementary Data. Enable supplementary data for each runway and add RVR availability when appropriate. Also enable the supplementary data for each visual glidepath system, adding TCH, VGSI angle and the light bar(s) distance from threshold (as appropriate). Ensure the approach light length is entered (to the nearest foot) in the Supplementary Data tab.

8.2.1.3.1. Runway centerline elevations are required when developing ILS CAT II/III or PAR approaches with a HATh of less than 200 feet.

8.2.1.3.1.1. Enter the runway centerline elevation for the point 200 feet prior to the runway threshold.

8.2.1.3.1.2. Enter the runway centerline elevation every 500 feet from the runway threshold to a point 3,000 feet down the runway (in the landing direction). When runway centerline elevation data cannot be obtained from a runway survey, ILS CAT II/III or PAR approaches with a HATh of less than 200 feet are not authorized. **Note:** Runway centerline elevation data is available in most NGA airfield surveys. This data may also be available from HQ AFFSA/A3M.

**Figure 8.2. Runway Physical, Landing, Takeoff and Displacement Lengths in GPD.**




8.2.1.4. Omni-directional NAVAIDs. Ensure that the NAVAID antenna elevation, assigned variation and radio class are entered.

8.2.1.5. Airport NAVAIDS. Check all ILS glide slope and localizer data against source documentation. Ensure the localizer course is entered as a true value (vice magnetic). Ensure that the assigned variation of the localizer is the same as the aerodrome assigned variation.

8.2.1.6. Add all ASR and PAR radar data, as needed.

8.2.1.7. Enter sourced aeronautical data as outlined in the sub-paragraphs below. The following list is not all-inclusive but contains those data elements that most often will affect procedure development. **Note:** Some data elements (localizer course width, runway true bearing, precision threshold coordinates, etc.), will trigger an operational warning when the accuracy entered does not meet Radio Technical Commission for Aeronautics (RTCA) recommended standards; *waiver action is not required* when these standards are not met.

8.2.1.7.1. Enter coordinates to the 0.01 second and the accuracy value as "**0.005**" in GPD for terminal VHF/UHF NAVAIDs, precision NAVAID (ILS/MLS) components, runway thresholds, fixes, and waypoints.

8.2.1.7.2. Field Elevation. Enter the elevation value to the nearest tenth of a foot and the accuracy value as "**0.01**" in GPD for the aerodrome reference point.

8.2.1.7.3. Enter the elevation value to the nearest tenth of a foot and the accuracy value as "**0.1 feet**" in GPD for precision NAVAID (ILS/MLS) components and runway thresholds. Enter the accuracy value of "**0.01**" in GPD for the localizer width.

8.2.1.7.4. Enter the elevation value to the nearest tenth of a foot and the accuracy value as "**1 foot**" in GPD for terminal VHF/UHF NAVAIDs.

8.2.1.7.5. Threshold crossing height. Enter the TCH (or RDH, as applicable to FTIP) to the nearest hundredth of a foot in GPD. **Note:** GPD will populate the build and publication reports with the nearest whole foot value.

8.2.1.7.6. Declination and magnetic variation (to include aerodrome and NAVAID assigned magnetic variation). Ensure assigned magnetic variation values used by GPD for locations in the CONUS and AF locations OCONUS are entered to the nearest whole degree (i.e., 10.0°; 4.0°, 38.0°, etc.) as assigned by HQ AFFSA/A3A. When using GPD to evaluate and document host nation instrument procedures for FTIP review or publication, ensure the magnetic variation values are entered exactly as reported in host nation source documentation. **Note:** When using a host nation NAVAID at an AF location to develop IFPs, and the NAVAID assigned magnetic variation is not a whole number, notify the host approval authority that the IFP was developed using the nearest whole degree.

8.2.1.7.7. Course/bearing (to include runway bearing and localizer alignment). Enter the course or bearing to the nearest 0.01° and the accuracy value as "**0.005**" in GPD.

8.2.1.7.8. Length/distance (to include runway lengths/widths and distances related to ILS/MLS components). Enter distances to the nearest whole foot and the accuracy value as "**1 foot**" in GPD. **Note:** Enter "**0.005**" as the accuracy value for localizer course width in GPD.

8.2.1.7.9. Angular data (to include ILS/MLS and Precision RNAV Glidepath Angle and VGSI angle). Enter the angle to the nearest 0.01° and the accuracy value as "**0.005**" in GPD.

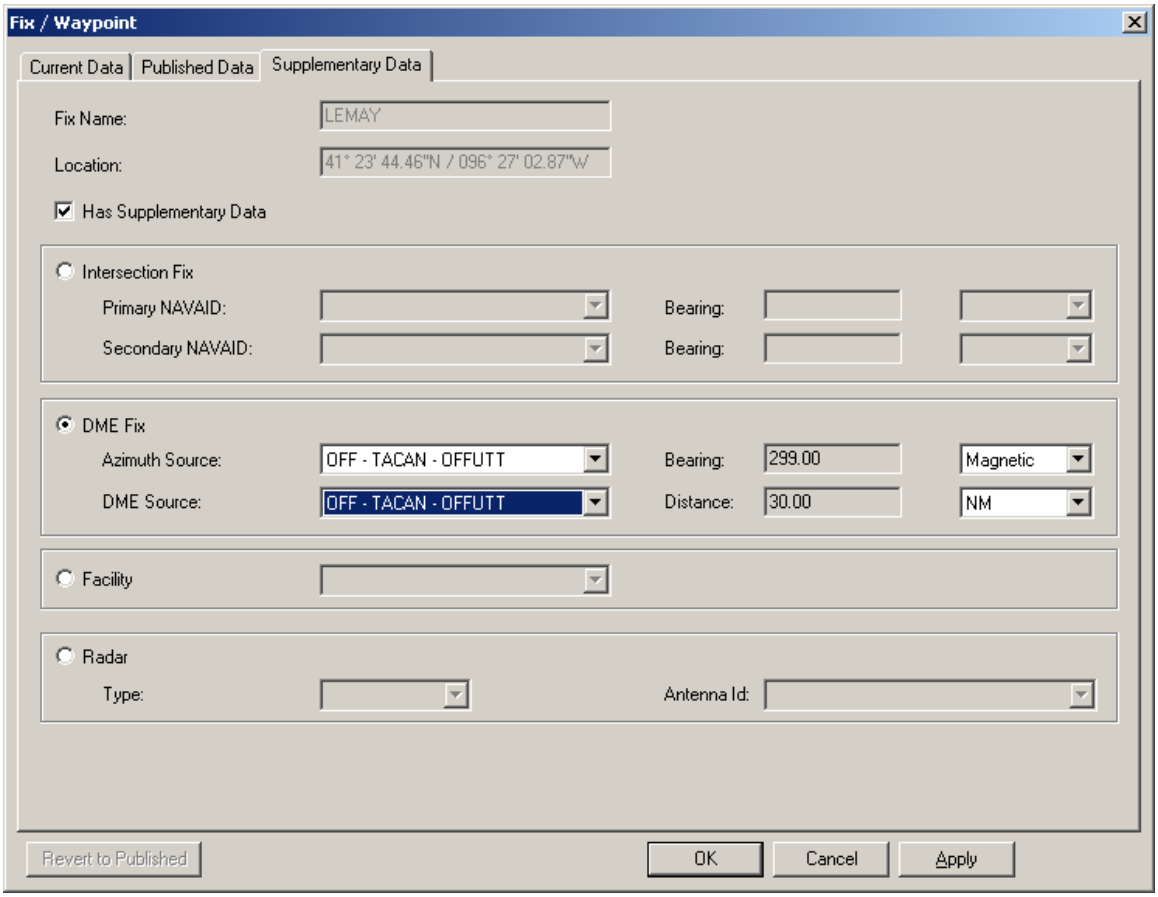
8.2.1.8. Add supplementary Named Fix or Waypoint data (**Figure 8.4**). Fix data imported from DAFIF does not include any data other than its geodetic location. Additional data is required for the TERPS evaluation to determine fix error correctly. Unless the sole intent for a named fix is to support RNAV procedure development, add this supplementary data to all named fixes that are required for ground-based procedure design. Obtain this supplementary data from FAA Order 7350.8, *Location Identifiers* (**Figure 8.3**) or from source copy FAA Form 8260-2. Named fixes without the added supplementary data will be marked ―RNAV only‖ and displayed only when building RNAV procedures.

8.2.1.9. Airspace. The DAFIF ingest process identifies incomplete airspaces. These airspaces will be deleted from the GPD database when "Delete Errors" is selected during import. Ensure all required airspaces are contained within the workspace.

**Figure 8.3. Fix Data for 'LEMAY' from FAA Order 7350. 8, Location Identifiers.**

| | |
|---|---|
| LEMAY NE | OFF*T*299.ØØ/3Ø.ØØ 41-23-44.46N Ø96-27-Ø2.87W |

**Figure 8.4. Fix or Waypoint Supplemental Data for 'LEMAY' in Data Manager.**




8.2.2. Evaluate the accuracy and completeness of obstacle data (see GPD Operations Manual, Vol 1, Table 2-1 and paragraph 11.6.3).

8.2.2.1. Manually entered obstacles must be adjusted with the accuracy values according to their source (Figure 8.5 and Figure 8.6). Identify the obstacle by map search and apply the values from Table 8.4 when accuracies cannot be determined from the data source.

8.2.2.2. Apply the worst-case horizontal and vertical accuracy from Table 8.4 and when unable to comply, annotate actions taken in GPD with user-entered notes.

8.2.2.3. Horizontal and vertical accuracies derived from any source may be reduced to 250 feet (75m) and 50 feet (15m), respectively, when confirmed by a flight inspection fly-by IAW FAA Order 8260.19, Appendix C, paragraph 2.b.(2)(f).

**Figure 8.5. Adjustment of Obstacle Height and Location Based on Horizontal and Vertical Accuracies.**

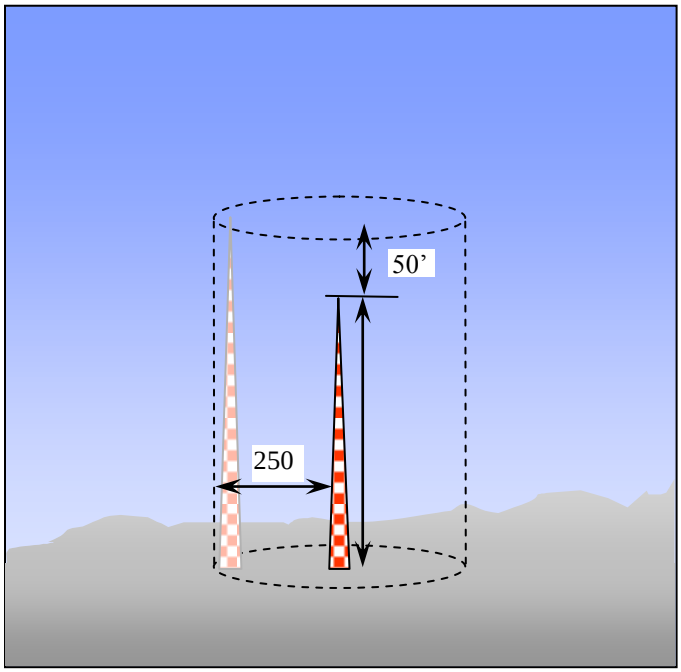
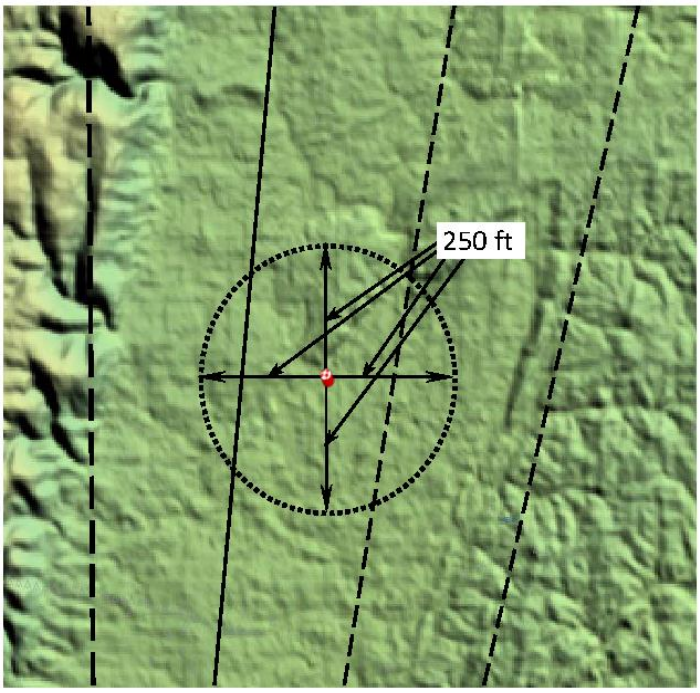



**Figure 8.6. Adjustment of Obstacle Location based on Horizontal Accuracy.**



**8.3. GPD Hardware Requirements (Table 8 1 and Table 8.2).** Minimum GPD hardware requirements for desktop and laptop systems are listed in Table 8.1 and Table 8.2 respectively. GPD software is configured to take advantage of a large cache to enhance system performance.

**Table 8.1. GPD Hardware (Desktop).**

| DESKTOP WORKSTATION | |
|---|---|
| OPERATING SYSTEM | Current GPD certified Microsoft Windows operating system |
| Central Processing Unit (CPU) | Quad Core Intel i7 processor |
| RAM | 16 GB (or higher), DDR3 SDRAM 1333 MHz |
| GRAPHICS CARD | High end graphics card that will support dual monitor VGA or DVI/VGA capable (ensure hardware compatibility e.g., NVIDIA Quadro series, minimum model #4000) |
| MONITORS | Two 24" (flat panel recommended), or equivalent viewing area (single 48" screen). |
| HARD DRIVE | Minimum: 450 GB SATA3 SSD |
| 2nd HARD DRIVE | Internal/External 500 GB or higher (determine size based on storage requirements) |
| DVD | Required; DVD+/-RW |
| NETWORK CARD | ETHERNET PCMCIA 10/100/1000 Base T (or appropriate LAN interface card) |
| SOUND | Required; sound card and speakers |
| ADDITIONAL SOFTWARE | Microsoft Office Pro Suite, Adobe® Pro, and a Scalable Vector Graphic (SVG) editor |
| COLOR PRINTER | Access to laser or ink jet technology. Minimum 600 DPI resolution. Configured with maximum RAM (minimum 32 MB RAM) |
| COLOR PLOTTER | Access to ink jet technology. Minimum 36 x 48 (E SIZE) paper size, with minimum 600 DPI resolution. Configured with maximum RAM (minimum 32 MB RAM) |

**Table 8.2. GPD Hardware (Laptop).**

| LAPTOP | |
|---|---|
| OPERATING SYSTEM | Current GPD certified Microsoft Windows operating system |
| Central Processing Unit (CPU) | Intel Core i7-2720QM (Quad-Core) Processor (2.20 GHz, 6 MB L3, 1333 MHz FSB) with Intel Turbo Boost Technology up to 3.3 GHz |
| RAM | 16 GB (or higher), DDR3 SDRAM at 1333 MHz |
| GRAPHICS CARD | 1 GB. Recommend: NVIDIA Quadro 2000M Optimus Video Card |
| HARD DRIVE | Minimum: 240 GB SSD |
| 2nd HARD DRIVE | Optional; 500 GB |
| DVD/CD-R/W | Required; DVD+/-RW |
| NETWORK CARD | ETHERNET PCMCIA 10/100/1000 Base T (or appropriate LAN interface card) |
| ADDITIONAL SOFTWARE | Microsoft Office Pro Suite, Adobe® Pro, and a Scalable Vector Graphic (SVG) editor |

## 8.4. Additional GPD Considerations and Miscellaneous.

8.4.1. GPD allows the instrument procedure designer the option to treat undetermined and unknown datums as if they were WGS-84. When this option is not exercised, it will result in a GPD violation that cannot be cleared. Therefore, when it appears that the obstacle in question may affect the instrument procedure, coordinate with NGA or the host nation for the location of the obstacle in the WGS-84 datum. When NGA or the host nation is not able to provide the location in the WGS-84 datum, check the WGS-84 box and apply the larger of the reported horizontal accuracy or the horizontal accuracy appropriate for an Operational Navigation Chart (ONC) or for a World Aeronautical Chart (WAC) from Table 8.3.

8.4.2. For manual additions and revisions to aeronautical or obstacle data in GPD, geodetic coordinates must be entered in the WGS-84 datum. When source data is in another datum, coordinates must be converted prior to use.

8.4.3. Do not use the GPD administrator log-in and password (ADMIN, ADMIN) when developing instrument procedures that will be used for flight operations.

8.4.4. When using GPD to develop procedures to support FTIP review and the host nation only publishes the RDH in the AIP, take the following actions;

8.4.4.1. ICAO and NATO criteria.

8.4.4.1.1. Enter the host-specified RDH value in the ILS supplementary data. The runway crown elevation abeam GS antenna should be entered for GPD to compute the RPI. Annotate in the procedure remarks actions taken and the rationale used whenever calculated values are entered.

8.4.4.1.2. Using the host nation threshold elevation, TCH and GS angle, and the calculated GPI, enter threshold elevation for GS antenna site elevation and the calculated GPI Distance as the GS antenna to threshold distance into Data Manager.

8.4.4.2. USAF criteria.

8.4.4.2.1. The RDH value may be entered, but the TCH, GPI and RPI are still calculated based on the glide slope site (ground) elevation and/or the crown elevation.

8.4.4.2.2. Always chart "TCH" in the profile view even when using the RDH value.

8.4.5. Workspace development. Do not establish the center of the workspace any farther than 5 NM from the following:

8.4.5.1. The departure end of runway (DER) for departures;

8.4.5.2. The airport reference point (ARP) for Diverse Vector Areas and circling approaches;

8.4.5.3. The radar antenna/pseudo antenna for MVACs (for example, when the furthest segment of any automated procedure or chart is the MVAC centered on XYZ aerodrome for a 200 NM radius, establish a workspace large enough to encompass 205 NM from the chart center);

8.4.5.4. The runway threshold (THR) for instrument approaches.

8.4.6. GPD Terrain Data Warning. When both DTED Level 1 and DTED Level 2 files are imported to build a workspace, GPD will overwrite the DTED Level 1 data with DTED Level 2 data, cell for cell. When the DTED Level 2 cell has partial coverage, the previous data from DTED Level 1 cell will not be available to fill in the missing data. This may result in gaps in terrain data where terrain data once existed. GPD will provide an operational warning when a procedure or chart segment is constructed in an area with missing or incomplete terrain data. When this warning is encountered, unless the missing cells are entirely over water, make every reasonable attempt to obtain a digital product that provides coverage over the area. Check all available digital sources. After evaluating all available sources and digital terrain coverage in the area is still missing or incomplete, ensure the terrain environment is properly considered. **Note:** Whenever the digital resources noted in this paragraph are not available, a manual, hard-copy map study of the entire IFP or affected segment, as applicable, is required to evaluate the terrain elevation data.

8.4.6.1. Determine the segment or sector of the instrument procedure with missing DTED coverage. GPD will indicate the area with missing terrain coverage. This can be done by scrolling the cursor in the 2-D view until the taskbar readout indicates "elevation missing" (Figure 8.7, Figure 8.8, and Figure 8.9).

8.4.6.2. Evaluate terrain in the area identified and add obstacles to Data Manager as necessary. Use of VMAP products is authorized to determine the highest contour elevation. Zoom in on the area of interest, use the info icon to determine the contour

line's object properties, and convert the "zv2" value from meters. Use good judgment to determine the density and location of obstacles added to Data Manager based on this search method. Consider the type procedure or segment being evaluated and the relative position of the area with incomplete terrain coverage. Add horizontal and vertical accuracies equivalent to the NGA 1:250,000 Joint Operations Graphic-Air (JOG) for VMAP1 and VMAP2 and equivalent to a WAC for VMAP0 (Table 8.3). After adding obstacles, revalidate segment and sector controlling obstacles for those procedure or chart portions that fall within an area with incomplete terrain coverage to determine if there are any remaining higher contours. Annotate in the procedure remarks actions taken along with supporting rationale. **Note:** When VMAP products are not available, a terrain analysis must be conducted on current, chummed paper copy maps scaled as required in Table 4.1. Document the results of the terrain analysis in the procedure package. CADRG maps are not authorized for terrain analysis.

8.4.6.3. When DTED Level 1 is available with complete workspace coverage, importing DTED Level 2 or higher may not be necessary. Use of SRTM data is optional.

**Table 8.3. Horizontal and Vertical Accuracies as Determined by Map Source.**

| MAP TYPE | HORIZONTAL ACCURACY | VERTICAL ACCURACY (see Note 5) |
|---|---|---|
| USAF Civil Engineering Map or Geobase CIP foundation (or digital equivalent) (apply Note 1) | 40 ft (12m) | 20 ft (6m) |
| USGS Topographical 1:20,000/1:24,000/1:25,000 | 40 ft (12m) | 20 ft (6m) (see Note 3) |
| NGA Topographical Line Map (TLM) 1:24,000/1:25,000/1:50,000/ 1:100,000 | 50 ft (15m) | 20 ft (6m) (see Note 3) |
| USGS Topographical 1:62,500/1:63,360 | 250 ft (75m) | 50 ft (15m) (see Note 3) |
| USGS Topographical 1:100,000 | 250 ft (75m) | 125 ft (38m) (see Note 3) |
| NGA Joint Operations Graphic (JOG) 1:250,000 | 500 ft (150m) | 125 ft (38m) (see Note 6) |
| USGS Topographical 1:250,000 | 1000 ft (300m) | 125 ft (38m) (see Note 3) |
| VFR Terminal Area Chart 1:250,000 | 1000 ft (300m) (see Note 2) | 250 ft (75m) (see Note 4) |
| VFR Sectional 1:500,000 | 1800 ft (550m) (see Note 2) | 250 ft (75m) (see Note 4) |
| NGA Tactical Pilotage Chart (TPC) 1:500,000 | 3400 ft (1000m) (see Note 2) | 500 ft (150m) (see Note 6) |
| World Aeronautical Chart (WAC) 1:1,000,000 | 3400 ft (1000m) (see Note 2) | 500 ft (150m) (see Note 4) |
| NGA Operational Navigation Chart (ONC) 1:1,000,000 | 3400 ft (1000m) (see Note 2) | 500 ft (150m) (see Note 6) |

**Note 1**. See FAA Order 8260.19, Appendix C, for Airport Obstruction Chart accuracies.
**Note 2**. Reduce horizontal accuracies for terrain features by one half. The larger accuracy applied to manmade obstacles is to account for displacement from application of cartographic license allowed by IACC specifications.
**Note 3**. When obstacles or mountain peaks are specifically marked by a spot elevation, the vertical accuracy changes to 3 feet (1m).
**Note 4**. When mountain peaks are specifically marked by a spot elevation, the vertical accuracy changes to 20 feet (6 m).
**Note 5**. The vertical accuracy column applies to the elevation of any feature on the applicable chart other than terrain. Add this value to the MSL value of each obstacle derived from the applicable chart when no other source (survey or actual measurement) is available. When evaluating terrain, apply paragraph 2.20.8.
**Note 6**. When spot elevations are specifically marked as an "accurate" spot elevation (with a dot), the vertical accuracy changes to 100 feet (30 m).

8.4.7. Runway Terrain Exclusion Area (RTEA). Activate the RTEA feature within GPD only when DTED in the area of the runway threshold is higher than the actual terrain and is

causing false penetrations to precision, visual area or departure obstruction surfaces. Document and retain the determination that DTED is higher than the actual terrain.

8.4.7.1. When the RTEA is activated;

8.4.7.1.1. Adjust the size of the RTEA to only be large enough to remove the false penetrations in the vicinity of the runway threshold. This task may require repeat adjustments to the size of the RTEA as the initial attempt may remove one or more false penetrations but additional false penetrations may appear even though the original penetration has been eliminated.

8.4.7.1.2. Enter terrain points manually as obstacles into the GPD database to model the actual terrain within the RTEA area. The number of obstacles that must be entered into the GPD database will depend on the size of the RTEA. Ensure the terrain within the RTEA is accurately modeled.

8.4.7.2. Terrain points can be obtained either by requesting a survey of the terrain within the RTEA or via map study. Use a map with contour elevation intervals close enough to provide an accurate terrain model. When entering these obstacles into the GPD database, utilize the adverse assumption technique to ensure GPD does not add the default 125 feet of vertical or 500 feet horizontal accuracy:

8.4.7.2.1. Apply the one foot less than the map contour line interval and then subtract one additional foot. In the GPD Obstacle properties enter 1 foot in the AGL accuracy and 1 foot in the horizontal accuracy fields. By doing this, the actual terrain within the RTEA can be accurately modeled.

8.4.7.2.2. Example. A point is located between contour elevations 315 and 320. Using the adverse assumption technique, the MSL altitude of the point is 319 feet. Now subtract one additional foot. Enter into the obstacle properties 318 feet for the MSL altitude, 1 foot AGL accuracy and 1 foot horizontal accuracy. With the data entered in this manner, the point will be evaluated by GPD as 319 feet MSL.

8.4.8. TERPS Development Software Problem Reporting. Timely software problem reporting is essential to ensure errors are corrected within a reasonable timeframe. Do not attempt to develop local or MAJCOM-specific work-arounds. Submit an incident through the AFFSA TERPS helpdesk as soon as practical after encountering or suspecting a problem with the software or when suggesting software improvements.

8.4.9. Documenting missed approach instructions. Document missed approach and alternate missed approach instructions in the Missed Approach Instructions tab of the Missed Approach Properties dialogue within the Instrument Procedure Designer module of GPD.

8.4.10. When it is necessary to make multiple obstacle edits, they may be made in the Data Manager Module (one at a time) vice the Procedure Designer Module of GPD. Application of one or more of the following techniques to reduce processing time is optional.

8.4.10.1. Disable the terrain analysis feature. When all obstacle edits have been completed, turn the terrain analysis feature back on.

8.4.10.2. Delete segments that do not require obstacle editing (except for segments required to support a limited GPD build). This can be done by performing the following steps, in order:

8.4.10.2.1. Open a saved procedure;

8.4.10.2.2. Delete segments that do not require obstacle editing;

8.4.10.2.3. Make all appropriate obstacle edits;

8.4.10.2.4. Close the procedure without saving it;

8.4.10.2.5. Reopen the procedure. All segments and all holding pattern templates will then be restored with the obstacle edits.

8.4.10.3. When a holding pattern contains obstacles requiring editing, reduce the number of templates to a single template. **Note:** Follow the steps in paragraph 8.4.10.2 except change the second step to read "Modify the holding pattern by ensuring the minimum altitude and the published altitude are identical."

8.4.10.4. ESA and MSA segments need only be developed and documented once. Separate the ESA and MSA evaluations from the associated IFP. Except for RNAV procedures, GPD will allow an ESA and MSA evaluation without having to evaluate a final, intermediate, initial or missed approach segment. RNAV approaches require building and evaluating a final segment before evaluation of the ESA or MSA. However, this technique will generate violations for not having the required segments in the instrument procedure and in the separated ESA and MSA evaluation. **Note:** Application of this technique does not make the procedure nonstandard and a waiver is not required. Place the following statement in the justification field of applicable violations: **A separate ESA/MSA evaluation was accomplished as an acceptable technique to reduce GPD processing time/reduce package size** (as applicable).

8.4.10.5. Use a combination of paragraphs 8.4.10.1, 8.4.10.2, 8.4.10.3, or 8.4.10.4.

**8.5. Use of Geographic Coordinates Derived from Hand-Held GPS Receivers.** Any instrument procedure developed using any coordinates that are derived solely from a hand-held GPS receiver are nonstandard and require waiver. Clearly identify all data derived directly from hand-held GPS receivers in the waiver request. **Note:** Using obstruction data derived from AF civil engineering sources (CE maps, CIP files, etc.) does not require waiver action regardless of the methodology or equipment used to gather the data.

**Figure 8.7. GPD Terrain Analysis Incomplete Warning.**

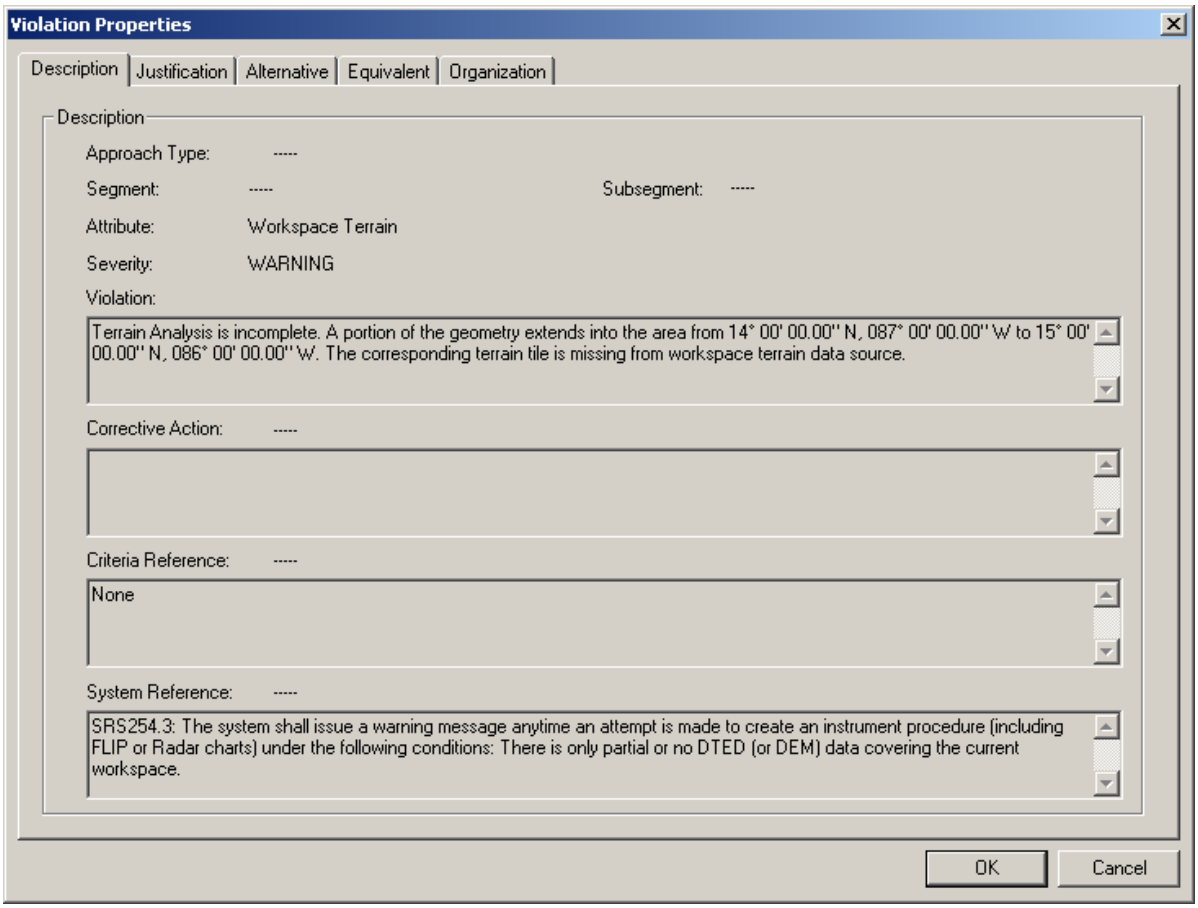


**Figure 8.8. Area with Missing Terrain Data.**

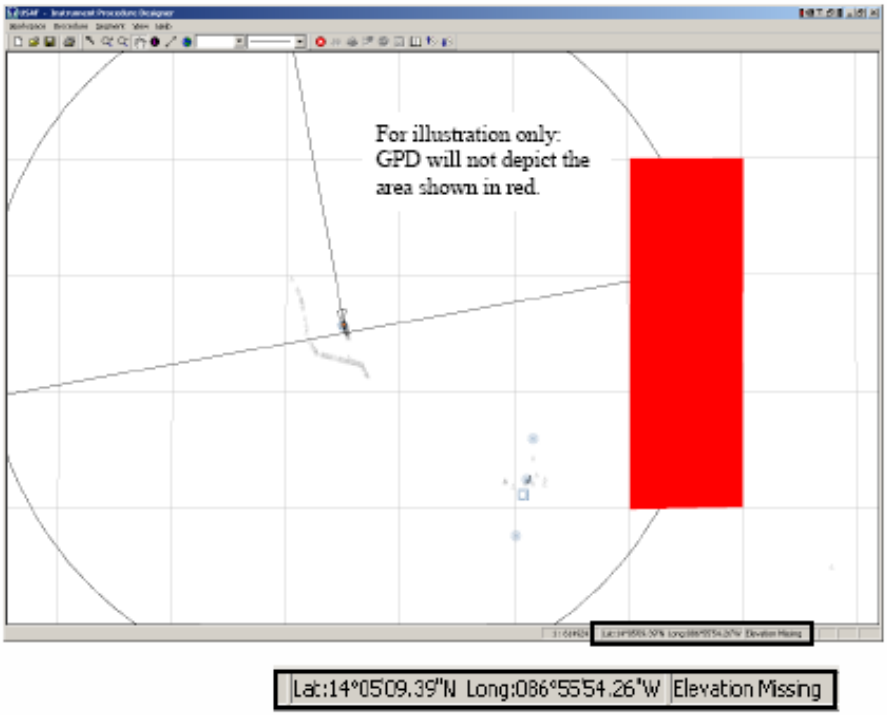
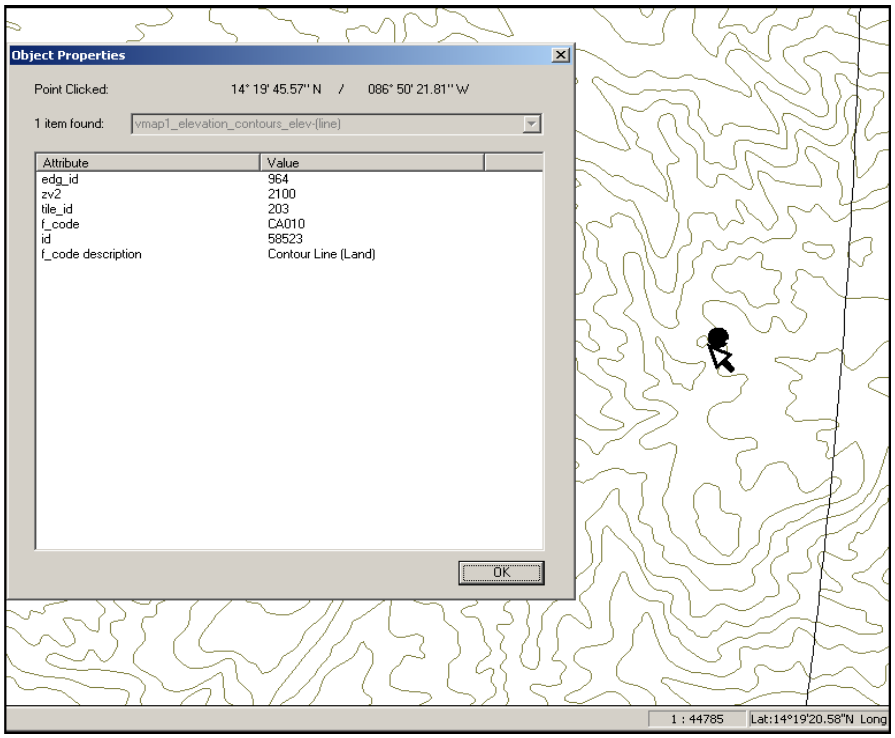



**Figure 8.9. Determining the Contour Elevation Using VMAP.**



## Chapter 9 (Added-AFSPC)

## THULE TEMPERATURE CORRECTION (ADDED)

**9.1. (Added-AFSPC) Thule Temperature Corrected Charts.** The differing values between standard and ambient temperature induced by extreme cold lead to a high probability for altimeter/altitude error at Thule. HQ AFSPC/A3SR TERPS will develop and maintain a cold weather MVAC and MIFRAC using the ICAO cold weather formulas found in the Airman's Information Manual, Table 7-2-3.

9.1.1. **(Added-AFSPC)** Due to mountainous terrain considerations, when developing the Thule cold weather MVAC, the adjustment for corrected altitude will be rounded up to 1000 feet and published to the cold weather MVAC. The cold weather value identified by the MVAC represents a cold weather temperature conversion to -30°C/-22°F (or possible 950 feet of error at 5000 feet above airport elevation). ***NOTE:*** Do not add the 1000 foot correction to Sectors 1 or 3. An extra 1000 foot obstacle clearance was previously added for mountainous terrain based on current Required Obstacle Clearance (ROC). Requiring an additional 1000 foot clearance in these areas is unnecessary and could negatively impact transition to the Instrument Approach Procedures. Annotate the following notes on all applicable FLIP products: "**Minimum Vectoring Altitudes are temperature corrected at -10c/14F in all areas except for a 3NM radius around the ASR antenna and from the 214T radial clockwise to the 304T radial, from 3 NM to 60NM.**" And "**IAP altitudes are not temperature corrected. All pilots must inform ATC if flying temperature corrected altitudes or are at an altitude other than that assigned by ATC, in Thule airspace.**"

9.1.2. **(Added-AFSPC)** Due to mountainous terrain considerations, when developing the Thule cold weather MIFRAC, the adjustment for corrected altitude will be rounded up to 1000 feet and published to the cold weather MIFRAC. The cold weather value identified by the MIFRAC represents a cold weather temperature conversion to -30°C/-22°F (or possible 950 feet of error at 5000' above airport elevation).

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## Attachment 1

## GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

***References***

*The Code of Federal Regulations (CFR)* (**http://www.gpoaccess.gov/ecfr**/)

Title 14 – Aeronautics and Space

PART 71; Designation of Class A, B, C, D, and E Airspace Areas; Air Traffic Service Routes; and Reporting Points

PART 73; Special Use Airspace

PART 77; Objects Affecting Navigable Airspace

PART 91; General Operating and Flight Rules

PART 93; Special Air Traffic Rules

PART 95; IFR Altitudes

PART 97; Standard Instrument Approach Procedures

PART 121; Operating Requirements: Domestic, Flag, and Supplemental Operations

Title 32 – National Defense

PART 989; Environmental Impact Analysis Process (EIAP)

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Chart Updating Manual (CHUM) and CHUM supplements (ECHUM data is acceptable)

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**(https://aero.geointel.nga.mil/products/digitalaero/enroute.cfm)** FLIP Terminal products

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*United States Air Force* (**http://www.e-publishing.af.mil**)

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FAA Order JO 7400.9, *Airspace Designations and Reporting Points*, (**http://www.faa.gov/air_traffic/publications**/)

FAA Order JO 7610.4, *Special Operations*, (**http://www.faa.gov/air_traffic/publications/spec_ops**/)

FAA Order JO 7900.2, *Reporting of Navigational Aids, Communication Facilities, and Aviation Weather Systems Data to the National Flight Data Center*, (**http://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentid/1020699**)

FAA Order JO 7930.2, *Notices to Airmen (NOTAM)*, (**http://www.faa.gov/air_traffic/publications**/)

FAA Order 8200.1, *United States Standard Flight Inspection Manual*, 1 October 2005, (**http://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/14505**)

FAA Order 8240.32, *Request for Flight Inspection Services*, 1 May 2008, (**http://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/73547**)

FAA Order 8240.36, *Flight Inspection Report Processing System (FIRPS)*, 1 October 2006, (**http://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/319232**)

FAA Order 8240.47, *Determination of Instrument Landing System (ILS) Glidepath Angle, Reference Datum Heights (RDH), and Ground Point of Intercept (GPI)*, 1 March 2001, (**http://www.faa.gov/documentLibrary/media/Order/8240_47C.pdf**)

FAA Order 8260.3, *U.S. Standard for Terminal Instrument Procedures (TERPS)*, Changes 1 – 25, 9 March 2012. (**http://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/11698**)

FAA Order 8260.4, *Instrument Landing System (ILS) Obstacle Risk Analysis*, 25 November 1986, (**http://www.faa.gov/documentLibrary/media/Order/8260.4.pdf**)

FAA Order 8260.19, *Flight Procedures and Airspace*, 22 February 2013, (**http://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentid/888468**)

FAA Order 8260.23, *Calculation of Radio Altimeter Height*, 6 July 1971, (**http://www.faa.gov/documentLibrary/media/Order/8260.23.pdf**)

FAA Order 8260.31, *Foreign Terminal Instrument Procedures*, 5 November 2012, (**http://www.faa.gov/documentLibrary/media/Order/8260.31C.pdf**)

FAA Order 8260.32, *U.S. Air Force Terminal Instrument Procedures Service*, 2 September 2011, (**http://www.faa.gov/documentLibrary/media/Order/8260.32E.pdf**)

FAA Order 8260.38, *Civil Utilization of Global Positioning System (GPS)*, 5 April 1995, (**http://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/11731**)

FAA Order 8260.40, *Flight Management System (FMS) Instrument Procedures Development*, 31 December 1998, (**http://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentid/11738**)

FAA Order 8260.42, *United States Standard for Helicopter Area Navigation (RNAV)*, 10 March 2009, (**http://www.faa.gov/documentLibrary/media/Order/8260.42B.pdf**)

FAA Order 8260.44, *Civil Utilization of Area Navigation (RNAV) Departure Procedures*, 23 March 2000, (**http://www.faa.gov/documentLibrary/media/Order/8260.44A%20Incl%20Chg%201-2.pdf**)

FAA Order 8260.45, *Terminal Arrival Area (TAA) Design Criteria*, 14 July 2000, (**http://www.faa.gov/documentLibrary/media/Order/8260.45A.pdf**)

FAA Order 8260.46, *Departure Procedure (DP) Program*, 30 September 2011, (**http://www.faa.gov/documentLibrary/media/Order/8260.46D%20Consolidated%20Chg%201-2.pdf**)

FAA Order 8260.48, *Area Navigation (RNAV) Approach Construction Criteria*, 8 April 1999, (**http://www.faa.gov/documentLibrary/media/Order/8260.48.pdf**)

FAA Order 8260.50, *United States Standard for Wide Area Augmentation Systems (WAAS), LPV Approach Procedure Construction Criteria*, 6 September 2002, (**http://www.faa.gov/documentLibrary/media/Order/ND/8260_50.pdf**)

FAA Order 8260.51, *United States Standard for Required Navigation Performance (RNP) Instrument Approach Procedure Construction*, 30 Dec 2002, (**http://www.faa.gov/documentLibrary/media/Order/8260.51.pdf**)

FAA Order 8260.52, *United States Standard for Required Navigation Performance (RNP) Approach Procedures with Special Aircraft and Aircrew Authorization Required (SAAAR)*, 3 June 2005, (**http://www.faa.gov/documentLibrary/media/Order/ND/8260_52.pdf**)

FAA Order 8260.53, *Standard Instrument Departures That Use Radar Vectors to Join RNAV Routes*, 25 July 2005, (**http://www.faa.gov/documentLibrary/media/Order/8260.53.pdf**)

FAA Order 8260.54, *The United States Standard for Area Navigation (RNAV)*, 12 July 2007, (**http://www.faa.gov/documentLibrary/media/Order/8260.54A.pdf**)

FAA Order 8260.56, *Diverse Vector Area (DVA) Evaluation*, 2 August 2011, (**http://www.faa.gov/documentLibrary/media/Order/8260.56.pdf**)

FAA Order 8400.13, *Procedures for the Evaluation and Approval of Facilities for Special Authorization Category I Operations and All Category II and III Operations*, 22 October 2009, (**http://www.faa.gov/documentLibrary/media/Order/8400.13.pdf**)

**Note:** The above Code of Federal Regulations (CFR), DOD, ICAO, NATO, AF and FAA publications and documents are required references. When a digital or electronic means (CD-ROM, via LAN, internet, etc.) is available to access these publications and documents, maintaining paper copies is not required. Listed web sites should have the required references available for review and download.

***Prescribed Forms***

AF IMT/Form 3640, *Nonprecision Computations*

AF IMT/Form 3642, *Circling Computations*

AF IMT/Form 3643, *Digital Map Request*

AF IMT/Form 3646, *DBRITE Low Altitude Alerting System (LAAS) Data Submission Form*

AF IMT 3980, *Instrument Procedure Waiver*

AF Form 3980, *Waiver*

AF IMT/Form 3992, *Instrument Procedure Flyability Check Instrument Approach Procedure (IAP)*

AF IMT/Form 3993, *Instrument Procedure Flyability Check Departure Procedure (DP)*

AF IMT/Form 4342, *Approach/Departure Signature Page*

AF IMT/Form 4343, *ATC Charts Signature Page*

***Adopted Forms***

AF IMT 813, *Request for Environmental Impact Analysis*

AF Form 847, *Recommendation for Change of Publication*

FAA Form 7100-3, *RNAV STAR (Data Record)*

FAA Form 7100-4, *STAR-Standard Terminal Arrival*

FAA Form 7460-1, *Notice of Proposed Construction or Alteration*

FAA Form 7460-2, *Notice of Actual Construction or Alteration*

FAA Form 7900-2, *Navigational Aid (NAVAID) Data Form*

FAA Form 7900-4, *Terminal Air Traffic Control Facilities Data Form*

FAA Form 7900-6, *Instrument Landing System (ILS) Form*

FAA Form 8260-2, *Radio Fix and Holding Data Record*

FAA Form 8260-10, *Instrument Approach Procedure Continuation Sheet*

FAA Form 8260-15C, *Departure (Data Record)*

***Abbreviations and Acronyms***

**AATCP**—Allied Air Traffic Control Publication

**AC**—Advisory Circular (FAA)

**ACC**—Air Combat Command

**ACFT**—Aircraft

**ADF**—automatic direction finder

**ADS**—aeronautical data sheet

**AER**—approach end of runway

**AETC**—Air Education and Training Command

**AF**—Air Force

**AFCEC**—Air Force Civil Engineer Center

**AFFSA**—Air Force Flight Standards Agency

**AFI**—Air Force instruction

**AFMAN**—Air Force manual

**AFMC**—Air Force Materiel Command

**AFPAM**—Air Force pamphlet

**AFRC**—Air Force Reserve Command

**AFREP**—Air Force representative

**AFSOC**—Air Force Special Operations Command

**AFSPC**—Air Force Space Command

**AGL**—above ground level

**AICUZ**—air installation compatible use zone

**AIM**—aeronautical information manual

**AIP**—aeronautical information publication

**AIRAC**—aeronautical information regulation and control

**ALS**—approach lighting system

**ALSF**—approach lighting system with sequenced flashing lights

**AMC**—Air Mobility Command

**A.N.D.**—AeroNavData

**ANG**—Air National Guard

**AOB**—airfield operations board

**AOF**—airfield operations flight

**AOR**—area of responsibility

**APV**—approach with vertical guidance

**ARA**—airborne radar approach

**ARINC**—Aeronautical Radio Incorporated

**ARP**—airport reference point

**ARSR**—air route surveillance radar

**ARTCC**—air route traffic control center

**ASBL**—approach surface baseline

**ASOS**—automated surface observing system

**ASR**—airport surveillance radar

**ASRR**—airfield suitability and restrictions report

**ATC**—air traffic control

**ATCALS**—air traffic control and landing systems

**ATD**—along track distance

**Auto Eval**—automated evaluation (GPD)

**AVN**—Aviation System Standards (FAA)

**AVNIS**—Aviation System Standards Information System

**AWOS**—automated weather observing system

**AZ**—azimuth

**BFSL**—best fit straight line

**CADRG**—compressed arc digitized raster graphics

**CAT**—category

**CC**—commander

**CCTLR**—chief controller

**CCW**—counter-clockwise

**CE**—civil engineering

**CENRAP**—center radar presentation

**CF**—course to fix (RNAV leg type)

**CFACC**—combined force air and space component commander

**CFR**—Code of Federal regulations

**CG**—climb gradient

**CHUM**—chart updating manual

**CIB**—controlled image base

**CID**—computer identification

**CIP**—common installation picture

**CMDA**—circling minimum descent altitude

**CNF**—computer navigation fix

**CONUS**—Continental United States (also see the next section of this attachment, Terms, for a detailed list of all land areas under the sovereignty of the US, the freely associated states, trust territories and insular possessions where the term CONUS applies to USAF TERPS functions)

**CRAF**—civil reserve air fleet

**CTA**—climb-to-altitude (associated with CG)

**CW**—clockwise

**DA**—decision altitude

**DA/H**—decision altitude/height

**DAFIF**—digital aeronautical flight information file

**DASR**—digital airport surveillance radar

**DBRITE**—digital bright radar indicator tower equipment

**DER**—departure end of runway

**DF**—direct to fix (RNAV leg type)

**DG**—descent gradient

**DH**—decision height

**DME**—distance measuring equipment

**DOD**—Department of Defense

**DP**—departure procedure

**DR**—dead reckoning

**DSN**—Defense Switched Network

**DTED**—digital terrain elevation data

**DVA**—diverse vector area

**DVOF**—digital vertical obstruction file

**ECHUM**—electronic chart updating manual

**EIAP**—environmental impact analysis process

**ETL**—engineering technical letter

**ESA**—emergency safe altitude

**ESV**—expanded service volume

**ESVMS**—ESV Management System

**FAA**—Federal Aviation Administration

**FAAO**—Federal Aviation Administration Order

**FAF**—final approach fix

**FAWP**—final approach waypoint

**FB**—fly-by (waypoint)

**FDAWG**—FLIP and Data Aeronautical Working Group

**FICO**—flight inspection central operations

**FIFO**—flight inspection field office

**FIL**—flight information list

**FLIP**—flight information publication

**FMO**—frequency management office

**FMS**—flight management system

**FO**—fly-over (waypoint)

**FPM**—feet per minute

**FRG**—Fix Report Generator

**Ft/NM**—feet per nautical mile

**FTIP**—foreign terminal instrument procedure(s)

**FTP**—fictitious threshold point

**GDSS**—Global Decision Support System

**GIS**—geographic information systems

**GNSS**—Global Navigation Satellite System

**GPA**—glidepath angle

**GPD**—Global Procedure Designer

**GPI**—ground point of intercept

**GPS**—Global Positioning System

**GQS**—glidepath qualification surface

**GS**—glide slope

**HAA**—height above airport

**HAT**—height above touchdown

**HATh**—height above threshold

**HQ**—headquarters

**IACC**—Inter-Agency Air Cartographic Committee

**IAF**—initial approach fix

**IAP**—instrument approach procedure

**IASA**—International Aviation Safety Assessment

**IAW**—in accordance with

**IAWP**—initial approach waypoint

**ICA**—initial climb area

**ICAE**—ICA end-line

**ICAO**—International Civil Aviation Organization

**IF**—intermediate fix

**IFP**—instrument flight procedure

**IFR**—instrument flight rules

**ILS**—instrument landing system

**IMC**—instrument meteorological conditions

**IMT**—information management tool

**INS**—inertial navigation system

**IWP**—intermediate waypoint

**JFACC**—joint force air and space component commander

**JOG**—joint operations graphic-air

**KIAS**—knots indicated airspeed

**LAAS**—Low Altitude Alerting System (associate with MSAW)

**LAN**—local area network

**LAT**—latitude

**LNAV**—lateral navigation (RNAV lateral navigation without positive vertical guidance)

**LNAV/VNAV**—lateral navigation (RNAV) with computed vertical guidance

**LOA**—letter of agreement

**LOC**—localizer (US standard)

**LON**—longitude

**LPV**—localizer performance with vertical guidance

**LTP**—landing threshold point

**MA**—missed approach

**MAG**—magnetic

**magvar**—magnetic variation

**MAHWP**—missed approach holding waypoint

**MAJCOM**—major command

**MALSR**—medium intensity approach lighting system w/runway alignment indicator lights

**MAP**—missed approach point

**MAWP**—missed approach waypoint

**MDA**—minimum descent altitude

**MDA/H**—minimum descent altitude/height

**MEA**—minimum enroute altitude

**MEARTS**—Microprocessor Enroute Automated Radar Tracking System

**MEDEVAC**—medical evacuation

**MFR**—memorandum for record

**MIFRAC**—minimum IFR altitude chart

**MIPS**—military instrument procedures standardization (NATO)

**MLS**—microwave landing system

**MMLS**—mobile microwave landing system

**MOA**—memorandum of agreement

**MOC**—master obstruction chart

**MOU**—memorandum of understanding

**MSA**—minimum safe/sector altitude

**MSAW**—minimum safe altitude warning

**MSL**—mean sea level

**MV**—magnetic variation

**MVA**—minimum vectoring altitude

**MVAC**—minimum vectoring altitude chart

**NA**—not available/not authorized/not applicable

**NAAM**—NCOIC, Airfield Automation Manager

**NACO**—National Aeronautical Charting Office

**NAD**—North American datum

**NAS**—National Airspace System

**NATO**—North Atlantic Treaty Organization

**NAVAID**—navigational aid

**NAVFIG**—Naval Flight Information Group

**NDB**—non-directional beacon

**NFDC**—National Flight Data Center

**NFDD**—National Flight Data Digest

**NGA**—National Geospatial-Intelligence Agency

**NGB**—National Guard Bureau

**NGS**—National Geodetic Survey

**NLT**—not later than

**NM**—nautical mile

**NOAA**—National Oceanic and Atmospheric Administration

**NOTAM**—notice to airmen

**NPA**—nonprecision approach

**OCONUS**—outside Continental United States

**OCS**—obstacle clearance surface

**ODP**—obstacle departure procedure

**OE/AAA**—obstruction evaluation/airport airspace analysis

**OG/CC**—operations group commander

**OIC**—officer in charge

**OIS**—obstacle identification surface

**OPR**—office of primary responsibility

**ORM**—operational risk management

**PACAF**—Pacific Air Forces

**PANS**—OPS—Procedures for Air Navigation Services – Aircraft Operations (ICAO)

**PAPI**—precision approach path indicator

**PAR**—precision approach radar

**PCG**—positive course guidance

**PFAF**—precise final approach fix

**PINS**—point in space

**POFZ**—precision obstacle free zone

**PPR**—post publication review

**PT**—procedure turn

**PV**—prevailing visibility

**PVASI**—pulsating visual approach slope indicator

**QFE**—altimeter setting above station

**QNH**—altimeter setting that provides height above mean sea level

**RABM**—range azimuth beacon monitor

**RADAR**—radio detection and ranging

**RAIL**—runway alignment indicator lights

**RAM**—random access memory

**RDH**—reference datum height

**RNAV**—area navigation

**RNP**—required navigation performance

**ROC**—required obstacle clearance

**RPI**—runway point of intercept

**RTEA**—runway terrain exclusion area

**RTRL**—reduced takeoff runway length

**RVR**—runway visual range

**RWY**—runway

**SAT**—satisfactory

**SCA**—Self Contained Approach

**SDF**—step-down fix/simplified directional facility

**SECDEF**—Secretary of Defense

**SIAP**—standard instrument approach procedure

**SID**—standard instrument departure

**SM**—statute mile

**SRTM**—shuttle radar topography mission

**SSM**—sidestep maneuver

**Stan/Eval**—standardization and evaluation

**STAR**—standard terminal arrival

**STARS**—standard terminal automation replacement system

**SUA**—special use airspace

**TA**—transition altitude

**TAA**—terminal arrival area

**TACAN**—tactical air navigation

**TAGGS**—Terminal Aeronautical GNSS Geodetic Survey

**TAN**—tangent

**TAS**—terminal amendment system

**TCH**—threshold crossing height

**TERPS**—terminal instrument procedures

**TF**—track to fix (RNAV leg type)

**THR**—threshold

**TLS**—transponder landing system

**TLv**—transition level

**UFC**—unified facilities criteria

**UHF**—ultra high frequency

**UNSAT**—unsatisfactory

**USAASA**—United States Army Aeronautical Services Agency

**USAF**—United States Air Force

**USAFCENT**—United States Air Forces Central

**USAFE**—United States Air Forces in Europe

**USDAO**—United States Defense Attaché Office

**USGS**—United States Geological Survey

**USN**—United States Navy

**VASI**—visual approach slope indicator

**VCA**—visual climb area

**VCOA**—visual climb over airport

**VDA**—vertical descent angle

**VDP**—visual descent point

**VFR**—visual flight rules

**VGSI**—visual glide slope indicator

**VHF**—very high frequency

**VMAP**—vector map

**VMC**—visual meteorological conditions

**VNAV**—vertical navigation

**VOR**—very high frequency omni-directional range station

**VOR/DME**—very high frequency omni-directional range station with distance measuring equipment

**VORTAC**—VOR and TACAN navigation facilities (collocated)

**V/V**—vertical velocity

**WAC**—world aeronautical chart

**WCH**—wheel crossing height

**WGS**—World Geodetic System

**WP or WPT**—waypoint (RNAV)

***Terms***

***Terms***—--For additional terms, refer to the glossaries in FAA Order 8260.3, FAA Order 7110.65, and DOD FLIP, *General Planning (GP)*.

**Air Force Flight Standards Agency (AFFSA)**—AF level agency responsible for the day-to-day management of the AF Terminal Instrument Procedure Program.

**Assigned Magnetic Variation (MV) of Record**—The current fixed value of magnetic variation assigned to each NAVAID and airport. Except when documenting host nation values, this value is always a whole number.

**ATC RADAR required or ATC RADAR monitoring required**—Charting this or any other similarly worded note in the planview of an instrument procedure signifies that aircraft using the procedure will be provided ATC radar service as defined in FAA Order 7110.65 during a particular phase of flight or throughout the entire procedure, *as specified in the note*. Before adding this type of notation to any instrument procedure, coordinate with the applicable ATC authority to ensure ATC has the capability and agrees to provide these services. **Note:** Instrument procedures with ATC radar service requirements should be avoided whenever possible.

**Automated Evaluation (Auto Eval) Function**—Refers to the use of the automated evaluation function within Procedure Designer. This function will only evaluate a single instrument procedure as it is opened within Procedure Designer or imported into Procedure Designer.

**Automated Evaluation (Auto Eval) Tool**—Refers to the use of the stand-alone tool where workspaces and instrument procedures can be evaluated in batch mode.

**AVNIS**—The FAA maintained aeronautical database used by flight inspection personnel to perform flight inspection on instrument procedures.

**Comparison Review**—A review that compares and documents differences between a commercially produced product (e.g., Jeppesen®, etc.) and the corresponding host nation product line-by-line, word-for-word, number-for-number, note-for-note, etc. This is not a criteria compliance review; therefore the host's accreditation status has no bearing on this type of review.

**Continental United States (CONUS)**—For the purposes of USAF TERPS and the guidance in this AFI, apply the term "CONUS" to the following locations: all 50 states; American Samoa;

the Federated States of Micronesia; Guam; the Marshall Islands; the Northern Mariana Islands; Puerto Rico; the U.S. Minor Outlying Islands (Baker Island, Howland Island, Jarvis Island, Kingman Reef, Navassa Island and Wake Island); and the Virgin Islands of the U.S. All other locations shall be defined as "OCONUS" locations.

**Final Approval Authority**—Designated individual or agency that guarantees an instrument procedure meets all criteria as stipulated in FAA Order 8260.3, NATO AATCP-1, this AFI, and other applicable directives. This authority also ensures the procedure package is complete.

**Flight Inspection**—An inspection conducted in accordance with FAA Order 8200.1, *US Standard Flight Inspection Manual*, or ICAO Annex 10, Volume I, Part I, Equipment and Systems. This inspection may also include checks for flyability of the instrument procedure.

**FLIP Maintenance**—Systematic procedure used by Unit and MAJCOM TERPS functions for tracking changes to instrument procedures and ensuring instrument procedures are kept current.

**FLIP Review**—A review of IFPs published in the DOD FLIP (Terminal) or via loose-leaf to identify changes which have occurred since the last (AIRAC) publication cycle.

**Flyability Check**—A live, simulator or tabletop check normally accomplished by the flying unit requesting an instrument procedure to determine the operational acceptability of the instrument procedure prior to flight inspection. See Attachment 7.

**Geodetic Airfield Survey**—An airfield survey that meets all requirements outlined in the current NGA produced **AIRFIELD SURVEY SPECIFICATION DOCUMENT** for the **TERMINAL AERONAUTICAL GNSS GEODETIC SURVEY PROGRAM**.

**High Altitude Instrument Procedure**—A terminal instrument procedure that usually begins (approach) or ends (departure) at or above 18,000 feet mean sea level (MSL). The beginning or ending altitude may be lower to achieve compatibility with airspace constraints and optimum traffic flows or to comply with host nation airspace and ATC practices.

**Instrument Flight Procedure (IFP)**—Instrument flight procedures specify routings, maneuvering areas, flight altitudes, and visibility minimums for instrument flight rules (IFR). These procedures include airways, jet routes, off-airway routes, take-off minima, instrument/radar approach procedures, instrument departure/obstacle departure procedures, and STARs.

**Low Altitude Instrument Procedure**—A terminal instrument procedure that usually begins (approach) or ends (departure) below 18,000 feet MSL.

**Magnetic Variation (magvar)**—The angular difference between true (geographic) north and magnetic north at a given location at a given time. This value can change from day to day.

**Magnetic Variation of Record**—The fixed value of magnetic variation assigned to each NAVAID and airport. Except when documenting host nation values, this value is always a whole number.

**MAJCOM Review**—An in-depth review of a new or revised instrument procedure performed by a MAJCOM TERPS authority. This review includes verification that the instrument procedure was designed IAW current criteria; ensures an appropriate equivalent level of safety is provided and documented when deviations to criteria are necessary; ensures any manual calculations were performed without error; ensures all required documentation is included and

complete; and ensures all required approval signatures have been obtained. The authority conducting the MAJCOM Review signifies the instrument procedure meets these requirements by signing the appropriate record in a designated location.

**Mountainous Area (ICAO)**—An area of changing terrain profile where the changes of terrain elevation exceed 900 meters (3000 feet) within a distance of 18.5 km (10.0 NM).

**NAVAID Slave Variation**—A fixed value of magnetic variation applied within equipment functioning as an aid to navigation to the true direction (course or bearing) in order to obtain the magnetic values for radials (courses) and bearings to and from the NAVAID. Slaving the NAVAID is a maintenance procedure that sets the facility to the assigned MV of Record. Re-slaving the facility may be required when differences between True North and the assigned MV of Record differs by a given value.

**Nonstandard Procedure**—An instrument procedure that deviates from the criteria or requirements of this instruction, FAA Order 8260.3, ICAO PANS-OPS, NATO AATCP-1, or any approved supplements to these documents.

**Positive Course Guidance (PCG)**—Positive course guidance is a continuous display of navigational data, which enables an aircraft to be flown along a specific course line. The AF assumes sub-segments based on radar or RNAV meet this definition.

**Post DAFIF Publication Review (PDPR)**—A DAFIF review conducted by AeroNavData (A.N.D.) after new or revised ARINC 424 coding has been published. A.N.D. reviews all DAFIF items listed on the ARINC Summary Page of the FAA Forms 8260-10/-21 or 7100-3 to ensure DAFIF compliance with these source documents.

**Post Publication Review (PPR)**—An in-depth review of the planview, profile, minima block, RADAR INSTRUMENT APPROACH MINIMUMS, operational and procedural data notes, caution and advisory notes, airport sketch, airport diagram (when available), graphic departures, and textual departures. This review validates correct charting by NGA of newly established and revised IFPs.

**Procedure Package**—A collection of documentation used to develop, revise, review and approve an instrument procedure. Examples of documents include maps, charts, automated products, computation sheets, and excerpts from host nation AIP.

**Public Use Procedure**—An instrument procedure that is not limited in use; it may be used by any agency or person.

**Restricted Use Procedure**—An instrument procedure that is limited in use; e.g., ‘USAF ONLY’ or ‘NOT FOR CIVIL USE’.

**Self-Contained Approach (SCA)**—A MAJCOM-approved arrival procedure flown from a minimum IFR altitude to a landing surface using only the navigational equipment on board the aircraft (GPS, airborne radar or other sensors). These procedures may be practiced in the NAS (or elsewhere with host-nation approval) under radar control, in conjunction with a published instrument approach procedure, in SUA or under VFR. **Note:** AF flying authority guidance for IMC use of self-contained approaches may be found in AFI 11-202V3.

**Screen Height**—Runway end crossing height.

**Special Use Procedure**—An instrument procedure developed and maintained IAW regulatory guidance specified in this AFI for a unique operational requirement that may be published in a loose-leaf format or in the DOD FLIP (Terminal).

**Standard Procedure**—An instrument procedure that conforms to the criteria and requirements of this instruction, FAA Order 8260.3, ICAO PANS-OPS, NATO AATCP-1, or any approved supplements to these documents.

**Standard Terminal Arrival (STAR)**—A STAR is a published IFR air traffic control arrival procedure that provides a transition from the en route structure to the terminal area. STARs may include one or more runway transitions providing guidance to either a standard instrument approach procedure or a point in space from which radar vectors are provided by ATC.

**Terminal Instrument Procedure**—Any procedure designed for instrument approach or departure of aircraft to or from an airport or point in space (for example, nonprecision and precision approaches and standard instrument departures).

**TERPS Review**—A TERPS review is an evaluation of a foreign terminal instrument procedure (FTIP) for compliance with the appropriate instrument procedure criteria or standard conducted IAW guidance and requirements established in Chapter 3 of this AFI.

## Attachment 1 (AFSPC)

## GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

***References***

AFI11-230**,** *Instrument Procedures,* 27 September 2013

AFI 33-360, *Publications and Forms Management,* 25 September 2013

AFGM1 to AFMAN 33-363, *Management of Records,* 13 October 2011

***Prescribed Forms***

AF IMT/Form 4342, *Approach/Departure Signature Page*

***Adopted Forms***

FAA Form 8260-2, *Radio Fix and Holding Data Record*

AF IMT 813, *Request for Environmental Impact Analysis*

***Abbreviations and Acronyms***

**AF —**Air Force

**AFI —**Air Force instruction

**AFRC —**Air Force Reserve Command

**AFSPC —**Air Force Space Command

**AGL —**above ground level

**ANG —**Air National Guard

**AOF/CC —**airfield operations flight commander

**ATC —**air traffic control

**ATCALS —**air traffic control and landing systems

**CE —**civil engineering

**DA —**decision altitude

**DAFIF —**digital aeronautical flight information file

**DET/CC —**detachment commander

**DOD —**Department of Defense

**DTED —**digital terrain elevation data

**DVA —**diverse vector area

**DVOF —**digital vertical obstruction file

**FAA —**Federal Aviation Administration

**FLIP —**flight information publication

**GPD —**Global Procedure Designer

**HQ —**headquarters

**ICAO —**International Civil Aviation Organization

**IFP —**instrument flight procedure

**IFR —**instrument flight rules

**IMT —**information management tool

**MAGVAR —**magnetic variation

**MDA —**minimum descent altitude

**MIFRAC —**minimum IFR altitude chart

**MSL —**mean sea level

**MVAC —**minimum vectoring altitude chart

**NOTAM —**notice to airmen

**NM —**nautical mile

**OE —**obstruction evaluation

**OE/AAA —**obstruction evaluation/airport airspace analysis

**OG/CC —**operations group commander

**QC —**quality control

**RDS —**records disposition schedule

**ROC —**required obstacle clearance

**TAS —**terminal amendment system

**TERPS —**terminal instrument procedures

**USAF —**United States Air Force

***Terms***

**Instrument Flight Procedure—**Instrument flight procedures specify routings, maneuvering areas, flight altitudes, and visibility minimums for instrument flight rules (IFR). These procedures include airways, jet routes, off-airway routes, take-off minima, instrument/radar approach procedures, instrument departure/obstacle departure procedures, and standard terminal arrivals.

**Magnetic Variation (magvar)—**The angular difference between true (geographic) north and

magnetic north at a given location at a given time. This value can change from day to day.

**Mountainous Area—**An area of changing terrain profile where the changes of terrain elevation exceeds 900 meters (3000 feet) within a distance of 18.5 kilometers (10.0 NM).

**Terminal Instrument Procedure—**Any procedure designed for instrument approach or departure of aircraft to or from an airport or point in space (for example, nonprecision and precision approaches and standard instrument departures).

**Temperature Correction—**A correction method that is applied to altimeters to compensate for errors caused by deviation from international standard atmosphere conditions.

# Attachment 2

## REFERENCE TABLES

### Table A2.1. Reportable Weather and RVR Values.

| CEILING | | | RUNWAY VISUAL RANGE (RVR) Reportable Values by Geographic Area | | PREVAILING VISIBILITY (PV) | | |
|---|---|---|---|---|---|---|---|
| These Ceiling Values (Feet) | | Convert to These Values (Meters) | CONUS RVR (Feet) | OCONUS RVR (Meters) | These PV Values (Statute Miles) | | Convert to These PV Values (Meters) |
| 100 | | 30 | 100 | | 1/8 | | 200 |
| 200 | | 60 | 200 | 50 | 1/4 | | 400 |
| 300 | | 90 | 300 | 100 | 3/8 | | 600 |
| 400 | | 120 | 400 | | 1/2 | | 800 |
| 500 | | 150 | 500 | 150 | 5/8 | | 1000 |
| 600 | | 180 | 600 | | 3/4 | | 1200 |
| 700 | | 210 | 700 | 200 | 7/8 | | 1400 |
| 800 | | 240 | 800 | 250 | 1 | | 1600 |
| 900 | | 270 | 900 | | 1 1/8 | | 1800 |
| 1000 | | 300 | 1000 | 300 | 1 1/4 | | 2000 |
| 1100 | | 330 | 1200 | 350 | 1 3/8 | | 2200 |
| 1200 | | 360 | | 400 | 1 1/2 | | 2400 |
| 1300 | | 390 | 1400 | | 1 5/8 | | 2600 |
| 1400 | | 420 | | 450 | 1 3/4 | | 2800 |
| 1500 | | 450 | 1600 | 500 | 1 7/8 | | 3000 |
| 1600 | | 480 | 1800 | 550 | 2 | | 3200 |
| 1700 | | 510 | 2000 | 600 | 2 1/4 | | 3600 |
| 1800 | | 540 | | 650 | 2 1/2 | | 4000 |
| 1900 | | 570 | 2200 | | 2 3/4 | | 4400 |
| 2000 | | 600 | | 700 | 3 | | 4800 |
| 2100 | | 630 | 2400 | 750 | 4 | | 6000 |
| 2200 | | 660 | 2600 | 800 | 5 | | 8000 |
| 2300 | | 690 | 2800 | | 6 | | 9000 |
| 2400 | | 720 | 3000 | 900 | ≥ 7 | | 9999 |
| 2500 | | 750 | | 1000 | | | |
| 2600 | | 780 | | 1100 | | | |
| 2700 | | 810 | 3500 | | | | |
| 2800 | | 840 | 4000 | 1200 | | | |
| 2900 | | 870 | | 1300 | | | |
| 3000 | | 900 | 4500 | | | | |
| 3100 | | 930 | | 1400 | | | |
| 3200 | | 960 | 5000 | 1500 | | | |
| 3300 | | 990 | 5500 | | | | |
| 3400 | | 1020 | 6000 | | | | |
| 3500 | | 1050 | Note: These RVR tables are not conversion tables. Select the geographic area then the reportable values listed | | | | |
| 3600 | | 1080 | | | | | |
| 3700 | | 1110 | | | | | |
| 3800 | | 1140 | | | | | |
| 3900 | | 1170 | | | | | |
| 4000 | | 1200 | | | | | |
| 4100 | | 1230 | | | | | |
| 4200 | | 1260 | | | | | |
| 4300 | | 1290 | | | | | |
| 4400 | | 1320 | | | | | |
| 4500 | | 1350 | | | | | |
| 4600 | | 1380 | | | | | |
| 4700 | | 1410 | | | | | |
| 4800 | | 1440 | | | | | |
| 4900 | | 1470 | | | | | |
| > 5000 but > 1000 | | Nearest 500 feet | | | | | |
| > 10000 | | Nearest 1000 feet | | | | | |

## Attachment 3

## CLARIFICATION OF INSTRUMENT PROCEDURE CRITERIA

### *Section A3A–Clarification of FAA Order 8260.3, Volume 1*

**A3.1. Purpose of this Attachment.** This attachment clarifies and expands criteria in FAA Order 8260.3 and AATCP-1 that are not complete or are open to interpretation. Apply FAA Order 8260.3 Changes 1-21, AATCP-1 and this attachment. The criteria in AFI 11-230 take precedence when there is any conflict with FAA Order 8260.3 or AATCP-1. **Note:** FAA Order 8260.3, Volume 1, Chapter 3 paragraph references have been updated to the new FAA Order 8260.3, Change 21 paragraph numbers.

**A3.2. Paragraph 5b. Circling (Added).** Do not design circling procedures for use with precision instrument approach procedures. This does not apply to host nation locations (FTIP) where the host country has authorized circling from a precision procedure that does not have an accompanying nonprecision procedure (i.e., ILS and circling minima without localizer minima). When authorizing localizer minima, circling procedures are appropriate (see AFMAN 11-217, Volume 1, Chapter 15, for aircrew guidance on circling approaches).

**A3.3. Paragraph 122a. Airport.** This paragraph refers to FAA AC 150/5300-13, Airport Design. Use AFI 32-1042, *Standards for Marking Airfields*, and UFC 3-260-01, *Airfield and Heliport Planning and Design* in lieu of this FAA AC. Additionally, AFI 32-1044, *Visual Air Navigation Systems*, and UFC 3-535-01, *Visual Air Navigation Facilities*, contain guidance found in this FAA AC. Non-compliance with these Civil Engineering directives may require a waiver approval through appropriate CE channels but do not require a TERPS waiver.

**A3.4. Paragraph 141 NONSTANDARD PROCEDURES.** Process waivers for military procedures according to this instruction.

**A3.5. Paragraph 142 CHANGES.** Process all non-procedural changes according to DOD FLIP, *General Planning (GP)*, Chapter 11, *Revision Schedules*; Procedural changes shall be processed through channels per paragraph 2.14.

**A3.6. Paragraph 150d. Airspace Actions.** Within the contiguous 48 states, Alaska, Hawaii and where required by host nation regulations, ensure each instrument procedure's primary obstruction clearance areas are within controlled airspace. Apply requirements in paragraph 1.11.

**A3.7. Paragraph 161 STRAIGHT-IN PROCEDURE IDENTIFICATION.** When DME and RADAR identify the FAF, add "**RADAR or DME REQUIRED**" to the planview of the procedure unless this equipment is named in the procedure identification. **Note:** Except for TACAN, this notation requirement for additional equipment applies to any equipment required (e.g., "**ADF or DME REQUIRED"** or "**ADF or RADAR REQUIRED"**, etc.) that is not included in the procedure identification or may be required to complete the approach; i.e., the missed approach.

**A3.8. Paragraph 163 DIFFERENTIATION.** At AF locations where both high and low altitude instrument approach or departure procedures are published in the same DOD or NACO FLIP, a procedure can be identified as a HI/LO procedure, e.g., HI/LO TACAN or VOR/DME Rwy 36. The FLIP procedure plate will be crosshatched along the upper left half of the top

border and along the lower right half of the bottom border. Ensure ceiling and visibility minimums for each required approach category are published.

**A3.9. Paragraph 202 LEVEL OCS.** 2000 feet of ROC should be applied to all holding patterns published in designated mountainous terrain. When an operational advantage can be achieved, the ROC may be reduced to no less than 1000 feet. **Note:** 2000 feet is applied to level holding at the end of a missed approach, in departure holding and at holding prior to an IAF. Do not apply 2000 feet to a Hold-in-Lieu of a Procedure Turn or to an ICAO racetrack segment.

**A3.10. Paragraph 211 POSITIVE COURSE GUIDANCE (PCG).** Use PCG, when available, to develop missed approach segments. When direct to a radial/DME fix or direct to a fix formed by intersecting radials (dead reckoning) is the only missed approach option, annotate the procedure with the following note "**Missed approach requires use of RNAV or ATC RADAR monitoring**" on the planview. This note mandates an aircraft use RNAV or that ATC radar be operational and used by ATC to ensure compliance with the published missed approach instructions, i.e., to act as a substitute for traditional PCG. The use of this note on the instrument procedure does not preclude the issuance of alternate missed approach instructions. **Note:** When the construction criteria in paragraph A3.10.1 cannot be met, and the note in this paragraph is not operationally advantageous (not charted), the missed approach is nonstandard and waiver action is required.

A3.10.1. The note in paragraph A3.10 is not required in the following instances:

A3.10.1.1. When developing any segment that starts at one NAVAID and goes directly to another NAVAID

A3.10.1.2. When developing any segment that goes directly to a NAVAID

A3.10.1.3. When developing any segment that involves starting at or overflying a NAVAID and reversing course back to the same NAVAID

A3.10.1.4. Straight Missed Approach, provided

A3.10.1.4.1. The missed approach segment is constructed directly to a NAVAID and then outbound on a radial to a fix (e.g., "**Climb to 3100 then right turn direct ABC VOR then climbing left turn on ABC R-280 to** (fix)**"** or

A3.10.1.4.2. The missed approach segment is constructed to intercept a radial from an on-airport NAVAID. When this method is used, publish missed approach instructions to intercept the radial to the missed approach clearance limit (e.g., "**Climb to 4000 on ABC R-355 then climbing right turn 6000 direct to** (clearance limit) …"

A3.10.1.5. Turning Missed Approach, provided

A3.10.1.5.1. The missed approach segment is constructed directly to a NAVAID and then outbound on a radial to a fix. When this method is used, publish missed approach instructions to turn to intercept the radial to the missed approach clearance limit (ex: "**Climb to 3100 then climbing left turn to 4000 direct ABC VOR. Turn left, intercept ABC R-355 to (**clearance limit**)**…"

A3.10.1.5.2. Precision (ILS/MMLS/PAR). The NAVAID providing missed approach guidance must be located on-airport and prior to the end of the Section 1 a-b

line. When the NAVAID is located elsewhere, build a combination straight and turning missed approach and apply paragraph A3.10.1.6.

A3.10.1.5.3. The "PCG available" box in GPD is ***not*** checked when developing the 'turn to fix' sub-segment

A3.10.1.6. Combination Straight and Turning Missed Approach

A3.10.1.6.1. When constructing a 'climb to altitude' followed by a 'turn to fix' missed approach provided

A3.10.1.6.1.1. A radial is established to the missed approach clearance limit and

A3.10.1.6.1.2. Instructions are published to intercept the radial prior to the missed approach clearance limit; ex: "**Climb to 3000 then turn right, intercept ABC R-355 to (**clearance limit**)**…", and

A3.10.1.6.1.3. The "PCG available" box in GPD is ***not*** checked when developing the 'turn to fix' sub-segment.

A3.10.1.6.2. When constructing a 'straight to fix' followed by a 'turn to fix' missed approach provided

A3.10.1.6.2.1. A radial is established to the missed approach clearance limit and

A3.10.1.6.2.2. Instructions are published to intercept the radial prior to the missed approach clearance limit. When providing a heading to intercept the radial, the intercept angle shall be a minimum of 15° and a maximum of 45° and

A3.10.1.6.2.3. The "PCG available" box in GPD is ***not*** checked when developing the 'turn to fix' sub-segment.

A3.10.2. When using ASR for PCG in surveillance radar and precision radar missed approach segments (paragraph A3.26), there is no requirement to chart any note indicating ATC radar or radar monitoring is required.

**A3.11. Paragraph 215 CONTROLLING OBSTACLE(S).** The controlling obstacle in the final approach segment shall be identified for charting on all nonprecision instrument approach procedures submitted to NGA. When submitting the obstacle data to NGA, do not add any accuracy value; submit the reported MSL height of the obstacle. Controlling obstacles have traditionally been the single highest obstruction in a segment or the obstruction with the greatest amount of OCS penetration. However, advances in AF TERPS automation, including the use of DTED (Level 1 or Level 2), SRTM and DVOF, will virtually assure that there will be multiple obstructions with the same elevation (height) or an equal amount of OCS penetration identified during instrument procedure segment construction. Apply the guidance in this paragraph when determining which obstruction shall be identified as the controlling obstacle. "Obstacle" in this context includes both terrain and man-made features. Adjustment for vertical and horizontal accuracies must be added to man-made structures; the value of the reported or user-declared vertical accuracy will be added to the MSL elevation of the obstruction to correctly identify the controlling obstacle. For horizontal adjustments, the greater of either the reported or user-declared horizontal accuracy or the accuracy of the geodetic coordinates will be considered, in effect creating a three-dimensional cylinder of a specified height and radius. **Note:** NGA will chart all requested obstacles IAW current charting specifications and cartographic judgment.

A3.11.1. Equivalent Height Definition. When PCG is provided and both primary and secondary areas are being evaluated to determine a segment's controlling obstacle, obstructions in the secondary area are evaluated based on their equivalent height value. The equivalent height value for obstructions in secondary areas is determined by subtracting the amount of OCS rise in the secondary area (measured from the edge of the primary area to the obstruction) from the obstruction's reported MSL elevation. This adjusted (lower) MSL elevation value is known as the obstruction's "equivalent height." **Note:** Even though the precision final segment X surface is primary area, an equivalent height is determined for both the X and Y surfaces. The equivalent height is determined by the obstruction's MSL elevation, minus the amount of X or Y surface rise (combined, when applicable) from the edge of the W surface.

A3.11.2. Effective Height Definition. When adding vertical accuracy to an obstruction's reported MSL elevation, the resulting value is known as the obstruction's "effective height."

A3.11.2.1. The effective height of an obstruction in the primary area with a reported vertical accuracy is equal to its reported MSL value plus vertical accuracy.

A3.11.2.2. The effective height of an obstruction in the secondary area with a reported vertical accuracy is equal to its reported MSL value plus vertical accuracy minus secondary OCS rise.

A3.11.2.3. The minimum segment altitude would be defined as an obstruction's effective height plus the appropriate ROC for the segment plus ROC adjustments.

A3.11.3. Segment or Sub-segment. For the purposes of this paragraph, a procedure segment or sub-segment generally starts at the fix or point encountered first as the procedure is flown and ends at the fix or point marking the beginning of the next segment. Example 1: A nonprecision final approach segment starts at the FAF and ends at the MAP. Example 2: A 12-DME arc initial segment starts at the IAF and ends at the intermediate fix or point.

A3.11.4. Feeder Route, Initial Approach, Intermediate Segment, and Nonprecision Final Segments. Select the controlling obstacle in the following order:

A3.11.4.1. Segments and sub-segments other than PT and hold-in-lieu of PT; the controlling obstacle shall be the obstruction with the highest height or highest effective height, as applicable.

A3.11.4.1.1. When multiple obstructions have the same highest height or same highest effective height, select the one closest to the end of segment line along the flight track (measured parallel to the runway centerline).

A3.11.4.1.2. When multiple obstructions have the same highest height or same highest effective height *and* are the same distance from the end of a segment, select the one closest to the runway centerline (measured perpendicular to the centerline).

A3.11.4.2. PT segments and sub-segments; the controlling obstacle shall be the obstruction with the highest height or highest effective height, as applicable.

A3.11.4.2.1. When multiple obstructions have the same highest height or same highest effective height, select the one closest to the PT fix.

A3.11.4.2.2. When multiple obstructions have the same highest height or same highest effective height *and* are the same distance from the PT fix, select the one closest to the inbound course line.

A3.11.4.3. Hold-in-lieu of PT segments and sub-segments; the controlling obstacle shall be the obstruction with the highest height or highest effective height, as applicable.

A3.11.4.3.1. When multiple obstructions have the same highest height or same highest effective height, select the one closest to the holding fix.

A3.11.4.3.2. When multiple obstructions have the same highest height or same highest effective height *and* are the same distance from the holding fix, select the one closest to the inbound course line.

A3.11.5. Precision Final Segment. Select up to three controlling obstacles, as applicable.

A3.11.5.1. Controlling Obstacle 1. When multiple obstructions penetrate a W, X, or Y OCS, select the obstruction that requires the highest Decision Altitude in the following order;

A3.11.5.1.1. The controlling obstacle shall be the penetrating obstruction with highest height or highest effective height, as applicable, above Approach Surface Base Line (ASBL).

A3.11.5.1.2. When multiple obstructions have the same highest height or same highest effective height above ASBL, select the one closest to the runway threshold (measured parallel to the runway centerline).

A3.11.5.1.3. When multiple obstructions have the same highest height or same highest effective height *and* are the same distance from the runway threshold, select the one closest to the runway centerline (measured perpendicular to the centerline).

A3.11.5.2. Controlling Obstacle 2. Select the obstruction requiring the highest GPA in the following order:

A3.11.5.2.1. The controlling obstacle shall be the obstruction requiring the greatest GPA, applying the following formula:

**Figure A3.1. Formula.**

$$102 \div \frac{1}{\left(\frac{E}{(D - (200 \div d)}\right)} = \text{GPA}$$

Where: $E$ = Obstruction Effective Height above ASBL

$D$ = Obstruction Distance from threshold

$d$ = 954 – GPI (from FAA Order 8260.3, Volume 3)

A3.11.5.2.2. When multiple obstructions produce the same GPA, select the one closest to the runway threshold (measured parallel to the runway centerline).

A3.11.5.2.3. When multiple obstructions produce the same GPA *and* are the same distance from the runway threshold, select the one closest to the runway centerline (measured perpendicular to the centerline).

A3.11.5.3. Controlling Obstacle 3. When multiple obstructions penetrate a W, X, or Y OCS, select the obstruction that requires the greatest amount of threshold displacement in the following order;

A3.11.5.3.1. The controlling obstacle shall be the obstruction with the greatest amount of OCS penetration.

A3.11.5.3.2. When multiple obstructions have the same amount of OCS penetration, select the one closest to the runway threshold (measured parallel to the runway centerline).

A3.11.5.3.3. When multiple obstructions have the same amount of OCS penetration *and* are the same distance from the runway threshold, select the one closest to the runway centerline (measured perpendicular to the centerline).

A3.11.6. Nonprecision Missed Approach. Controlling obstacles are identified separately based on the OCS evaluation, the minimum missed approach obstruction altitude evaluation and the missed approach holding evaluation.

A3.11.6.1. Missed approach OCS evaluation (including 'Climb-In-Hold' evaluations).

A3.11.6.1.1. When multiple obstructions penetrate the OCS, identify the controlling obstacle in the following order;

A3.11.6.1.1.1. The controlling obstacle shall be the obstruction that requires the highest climb gradient to eliminate the penetration.

A3.11.6.1.1.2. When multiple obstructions require the same climb gradient to eliminate the penetration, select the one that causes the highest climb-to-altitude.

A3.11.6.1.1.3. When multiple obstructions require the same climb gradient to eliminate the penetration *and* have the same climb-to-altitude, select the one closest to the runway centerline.

A3.11.6.1.2. When no penetrating obstructions exist, identify the controlling obstacle in the following order;

A3.11.6.1.2.1. The controlling obstacle shall be the obstruction with the elevation that comes closest to penetrating the OCS.

A3.11.6.1.2.2. When multiple obstructions are equally close to penetrating the OCS, select the one that is farthest away from the missed approach point (MAP), using the appropriate method for measuring this distance. **Note:** The obstruction farthest from the MAP shall be selected as it can be equated to the obstruction that would have required the highest climb-to-altitude if a penetration had existed.

A3.11.6.1.2.3. When multiple obstructions are equally close to penetrating the OCS *and* are the same distance from the MAP, select the one closest to the runway centerline.

A3.11.6.2. Minimum missed approach obstruction altitude; identify the controlling obstacle in the following order;

A3.11.6.2.1. The controlling obstacle shall be the obstruction within the missed approach area with the highest height or highest effective height, as applicable.

A3.11.6.2.2. When there are multiple obstructions with the same height or same effective height, select the one closest to the MAP using the appropriate method for measuring distance.

A3.11.6.2.3. When there are multiple obstructions with the same height or same effective height *and* are the same distance from the MAP, select the one closest to the runway centerline.

A3.11.6.3. Minimum missed approach holding; select the controlling obstacle in the following order;

A3.11.6.3.1. The controlling obstacle shall be the obstruction with the highest height or highest effective height, as applicable.

A3.11.6.3.2. When there are multiple obstructions with the same height or same effective height, select the one closest to the holding fix.

A3.11.6.3.3. When there are multiple obstructions with the same height or same effective height *and* are the same distance from the holding fix, select the one closest to the inbound course line.

A3.11.7. Precision Missed Approach. Controlling obstacles are identified separately for Section 1, Section 2, minimum missed approach obstruction altitude and minimum holding altitude.

A3.11.7.1. Section 1. Select the controlling obstacle in the following order;

A3.11.7.1.1. When penetrating obstructions exist, the controlling obstacle shall be the one that requires the highest Decision Altitude (DA).

A3.11.7.1.2. When no penetrating obstructions exist, select the one with the elevation that comes closest to penetrating the OCS.

A3.11.7.1.3. When no penetrating obstructions exist *and* multiple obstructions are equally close to penetrating the OCS, select the one closest to the DA point (measured parallel to the runway centerline).

A3.11.7.1.4. When the conditions in paragraph A3.11.7.1.3 exist *and* multiple obstructions are the same distance from the DA point, select the one closest to the runway centerline (measured perpendicular to the centerline).

A3.11.7.2. Section 2 (including ‘climb-in-hold’ obstacles). Select the controlling obstacle in the following order;

A3.11.7.2.1. When penetrating obstructions exist:

A3.11.7.2.1.1. The controlling obstacle shall be the obstruction that requires the highest climb gradient to eliminate the penetration.

A3.11.7.2.1.2. When multiple obstructions require the same climb gradient to

eliminate the penetration, select the one that causes the highest climb-to-altitude.

A3.11.7.2.1.3. When multiple obstructions require the same climb gradient to eliminate the penetration *and* result in the same climb-to-altitude, select the one closest to the runway centerline.

A3.11.7.2.2. When no penetrating obstructions exist:

A3.11.7.2.2.1. The controlling obstacle shall be the obstruction with the elevation that comes closest to penetrating the OCS.

A3.11.7.2.2.2. When multiple obstructions are equally close to penetrating the OCS, select the one that is farthest away from the Section 1 termination point using the appropriate method for measuring that distance.

A3.11.7.2.2.3. When multiple obstructions are equally close to penetrating the OCS *and* are the same distance from the Section 1 termination point, select the one closest to the runway centerline.

A3.11.7.3. Minimum missed approach obstruction altitude; select the controlling obstacle in the following order;

A3.11.7.3.1. The controlling obstacle shall be the obstruction within the missed approach area with the highest height or highest effective height, as applicable.

A3.11.7.3.2. When there are multiple obstructions with the same highest height or same highest effective height;

A3.11.7.3.2.1. Section 1. Select the one closest to the DA point.

A3.11.7.3.2.2. Section 2. Select the one closest to the Section 1 termination point using the appropriate method for measuring this distance.

A3.11.7.3.2.3. When there are multiple obstructions meeting the criteria in paragraphs A3.11.7.3.2.1 *and* A3.11.7.3.2.2, select the one closest to the runway centerline.

A3.11.7.4. Minimum Holding Altitude. Select the controlling obstacle using the same method as for nonprecision missed approach in paragraph A3.11.6.

A3.11.8. Departures.

A3.11.8.1. When the 40:1 OCS is penetrated, the controlling obstacle shall be the obstruction that requires the highest climb gradient. When multiple obstacles are identified having the same climb gradient, the obstacle that is closest to the DER will be the controlling obstacle.

A3.11.8.2. When the 40:1 OCS is not penetrated, the controlling obstacle shall be the obstacle with the least amount of clearance between the obstacle and the 40:1 OCS. When multiple obstacles are identified having the same amount of clearance, the obstacle that is closest to the DER will be the controlling obstacle.

A3.11.9. ESA, MSA, ATC Charts (MVACs and MIFRACs) and TAA right and left base or straight-in areas.

A3.11.9.1. The controlling obstacle shall be the obstruction either in the sector, area or buffer (as applicable) that results in the greatest minimum altitude.

A3.11.9.2. When there are multiple obstructions that result in the same minimum altitude, the controlling obstacle shall be the one inside the sector or area boundary (as opposed to the buffer area) and closest to the origin (center of chart, or appropriate waypoint).

A3.11.9.3. When there are multiple obstructions resulting in the same minimum altitude but all are in the sector or area buffer, the controlling obstacle shall be the one closest to the sector or area edge.

**A3.12. Paragraph 220 FEEDER ROUTES.** Do not construct feeder routes containing a turn point defined by a fix between the feeder facility and the IAF.

**A3.13. Paragraph 221 MINIMUM SAFE/SECTOR ALTITUDES (MSA).** Apply guidance from paragraph 221 but note that the navigation facility on which a procedure is based may not always provide the pilot with the most useful origin for the MSA. If more useful information can be obtained from a facility other than the one on which the procedure is based, use that facility provided it is within 30 miles of the airport. Chart this facility as the MSA origin only after the instrument procedure designer has completed coordination with all concerned agencies. Center the MSA at the MAWP on all straight-in RNAV (GPS) approaches.

**A3.14. Paragraph 230 INITIAL APPROACH SEGMENT.** The initial approach segment may be made up of a single segment or a series of sub-segments. Each sub-segment can be a straight course or radial, an arc, a PT, a teardrop turn, penetration turn, a course reversal based on non-collocated facilities, a hold-in-lieu of PT or a dead reckoning sub-segment.

A3.14.1. When the turn between initial sub-segments equals or exceeds 90°, a radial or bearing which provides at least 2 NM lead shall be identified. Ensure a radial or bearing that provides at least 2 NM lead is published on all arc segments prior to intersecting the next segment.

A3.14.2. When altitudes are specified at the fixes marking both the beginning and end of a segment or a sub-segment (to include stepdown fixes), initial descent gradient criteria shall be applied.

A3.14.3. Straight and Arc Courses. The turn between a straight or arc sub-segment and the following sub-segment shall not exceed 120°. Turns greater than 120° require a course reversal sub-segment.

A3.14.4. Course Reversals. Straight or arc sub-segment(s) may precede a course reversal sub-segment (PT, high altitude teardrop penetration turn, course reversal based on non-collocated facilities or hold-in-lieu of PT). However, the course reversal sub-segment must be the last sub-segment encountered prior to reaching the intermediate or final approach segment. This restriction does not apply when FAA Order 8260.3, Volume 1, paragraph 244e(1) is applied.

A3.14.4.1. Procedure Turn (PT). When a sub-segment precedes the PT, use the Initial Approach Fix (IAF) crossing altitude when applying FAA Order 8260.3, Volume 1, paragraph 234b and Table 1 to determine the PT primary area dimensions. **Note:** Unless the procedure turn/penetration turn distance is indicated by the appropriate DME fix,

ensure a remain within distance equal to the "Procedure Turn Length" or the "Specified Penetration Turn Distance" listed on the GPD Publication Report is charted on all instrument procedures using a PT or a teardrop turn for course reversal; e.g., "**Remain within 10 NM**" or "**Remain within 24 NM**".

A3.14.4.2. High Altitude Teardrop Penetration Turn. When determining the penetration turn distance and course divergence from FAA Order 8260.3, Volume 1, Paragraph 235b, and Table 2, do not consider the altitude loss in the sub-segment prior to the penetration turn fix or facility. Delay before descent shall only be applied from the penetration turn fix or facility.

A3.14.4.3. Hold-in-lieu of Procedure Turn. The minimum holding sub-segment altitude shall be no lower than the IAF crossing altitude of the preceding sub-segment (when specified).

A3.14.5. Dead Reckoning. A dead reckoning sub-segment must be the last sub-segment encountered prior to reaching the intermediate or final approach segment.

**A3.15. Paragraph 231 ALTITUDE SELECTION.** The altitude selected shall not be below the teardrop completion altitude where a teardrop is required.

**A3.16. Paragraph 232a(1). Courses.** Also apply this paragraph when both segments are initial segments.

**A3.17. Paragraph 232b. Area.** When the arc radius is greater than 4 NM but less than 6 NM, the radius of the inner secondary arc shall be zero. When the arc radius is less than or equal to 4 NM, then the radius of the inner primary arc shall be zero and there shall be no secondary inner arc.

**A3.18. Paragraph 234d. Descent Gradient.** When the difference between the PT completion altitude and the FAF altitude exceeds the altitude difference limits shown in Table 1B, round the required excess altitude up to the next 100-foot increment. For example, if the required excess altitude is 310 feet, round up to 400 feet. This will result in an increase of 2 miles to the PT length and maneuvering zone.

**A3.19. Paragraph 235 INITIAL APPROACH BASED ON HIGH ALTITUDE TEARDROP PENETRATION.** This criteria shall be used in situations where the altitude to be lost is 5000 feet or more. Where less than 5000 feet of altitude is to be lost, a PT or other initial segment criteria shall be used. When the procedure requires a delay before descent of more than 5 miles, the distance in excess of 5 miles (e.g., descent is delayed 8 miles; excess distance is 3 miles) shall be added to the distance the turn commences.

**A3.20. Paragraph 235b. Area. (1) Size.** The altitude to be lost in the procedure in the third sentence; "The penetration turn distance depends on the altitude to be lost in the procedure and the point at which the descent is started (see table 2)" refers to the altitude between the IAF and the runway threshold.

**A3.21. Paragraph 243 INTERMEDIATE APPROACH SEGMENT BASED ON AN ARC.** Application of this paragraph is not authorized.

**A3.22. Paragraph 252 VERTICAL DESCENT ANGLE.** Construct NPA procedures, except those published in conjunction with vertically guided minima, to provide a vertical descent angle (VDA)/TCH that is coincident with the associated VGSI angle/TCH. When VGSI is not

installed, when the VGSI angle is not between 2.50° and 3.50° or when the VGSI TCH is not within the parameters of FAA Order 8260.3, Vol 3, Chapter 2, Table 2-3, construct a VDA ≥ 2.50° or ≤ 3.50° (optimum is 3°) with an appropriate TCH value from Table 2-3. Except when VGSI is not installed, ensure the note "**VGSI and descent angles not coincident** (**VGSI Angle** {angle} **TCH** {feet})" is charted in the profile view of the procedure when the VGSI angle is more than 0.2° from the GPA or when the VGSI TCH is more than 3 feet from the procedure TCH.

A3.22.1. Except for ASR approaches, ensure the VDA and TCH are charted on each NPA procedure.

A3.22.2. Whenever precision/vertically guided approach glidepath angles and/or TCH values are not coincident with VGSI data, publish the following note, "**VGSI and** (**ILS/MLS/PAR/ TLS/LNAV/VNAV/RNAV**, as appropriate) **glidepath not coincident** (**VGSI Angle** {angle} **TCH** {feet})". **Note:** Also ensure this note is charted with the IFP when flight inspection has made this determination.

A3.22.3. When no other option is practical and a stepdown fix altitude on a straight-in aligned procedure is above the VDA from FAF to TCH, publish the greatest VDA along with the TCH and associate it with the applicable stepdown fix with a note, e.g., "***SDF to MAP: 3.26/55**" or "***LISSA to RW19L: 3.10/50**" on the approach plate.

A3.22.4. Establish stepdown fix altitudes in the final approach segment of a straight-in approach without regard to the CMDA value; i.e., these stepdown fix altitudes do not need to be equal to or greater than the CMDA.

A3.22.4.1. Each stepdown fix altitude in the final approach segment shall be equal to or greater than the lowest straight-in MDA and equal to or greater than the altitude at any subsequent stepdown fix.

A3.22.4.2. When establishing stepdown fixes on a circling only approach, each stepdown fix altitude shall be equal to or greater than the lowest CMDA and equal to or greater than the altitude at any subsequent stepdown fix.

**A3.23. Paragraph 253 VISUAL DESCENT POINT (VDP).** This guidance is applicable to straight-in instrument procedures only. With the exception of ARA and ASR approaches, establish a VDP for all straight-in, NPA procedures. When publishing a VDP, identify the location of the VDP by DME or by the NM distance to the threshold. Exceptions may apply to procedures outside CONUS (i.e., host nation procedures and military bases applying AATCP-1 criteria).

A3.23.1. A VDP fix can be less than one mile from a stepdown fix or missed approach point, provided chart clarity is not compromised.

A3.23.2. When a VDP cannot be published, ensure the reason is documented in the procedure package.

A3.23.3. When using a non-collocated DME source to identify the VDP, the angle of divergence between the DME facility and the final approach course shall not exceed 23°. The maximum allowable fix error is .54 NM. When GPD generates a fix error violation of .54 NM or less, justify the violation with this paragraph; waiver action is *not* required.

**A3.24. Paragraph 270 MISSED APPROACH SEGMENT.** Missed approach segments using DME arcs are not permitted.

**A3.25. Paragraph 272 MAP.** A crossing radial may be used to define the missed approach point (MAP). When using this option, the procedure is nonstandard and requires waiver processing. The maximum acceptable fix error is 1/2 mile for a crossing radial. When considering missed approach point locations using a DME fix or a crossing radial, establish the MAP at or prior to the first usable landing surface. The on-airport NAVAID may be identified as the MAP only when a usable, satisfactory DME fix or crossing radial is not available.

**A3.26. Paragraph 274 STRAIGHT MISSED APPROACH OBSTACLE CLEARANCE.** Instances may occur when an obstruction penetrates the 40:1 precision or nonprecision missed approach surface and other solutions (e.g., DA or MDA adjustments) are not feasible. Apply the appropriate formula from paragraph A4.17 and publish a climb gradient that clears the obstruction. Required minimum climb rate information must be graphically displayed on the procedure. The altitude or fix to which the climb gradient must be maintained shall be published. A climb gradient required to prevent a climb-in-hold situation at the end of the missed approach segment shall not be considered nonstandard. **Note:** Guidance in this paragraph also applies to FAA Order 8260.3, Volume 1, paragraphs 276, and 277a through 277d.

**A3.27. Paragraphs 274b**, **276e** and **277d.** When the clearance limit is located on an enroute airway, the charted missed approach altitude shall not be lower than the applicable MEA. When the clearance limit is not part of the enroute structure, the charted missed approach altitude should not be lower than the highest MIFRAC sector altitude (USAF IFR facility) or the highest En Route Minimum IFR Altitude Chart sector altitude (FAA IFR facility) within any portion of the missed approach primary area. For turning missed approach, consider the highest MIFRAC sector altitude that falls within any portion of the missed approach primary area for all authorized approach categories. When it is not practical to ensure the missed approach altitude is at or above the highest MIFRAC sector altitude within any portion of the missed approach primary area, apply paragraphs 274b, 276e or 277d, as appropriate, and chart the note "**RADAR REQUIRED**." **Note:** Radar coverage must exist throughout the missed approach segment and the clearance limit and missed approach altitude must be within the service volume of the NAVAID(s) that define the clearance limit.

**A3.28. Paragraph 276b. More Than 90° Turn.** The altitude of the OCS for any point in Zone 3 shall start at the lowest MDA minus the sum of the ROC plus adjustments for the final approach at Point B and rise by the OCS gradient from point B. Zone 3 obstacle measurements extend to the edge of the secondary area and then extend perpendicular to the missed approach course into the secondary.

**A3.29. Paragraph 282 COURSE/DISTANCE FIXES.** Describe in nautical miles when a "fly-off" (level flight) is maintained from the primary facility or fix before the beginning of the penetration turn, PT, or descent. Depict the beginning of the penetration turn, PT, or descent on the planview and profile by DME values when available.

**A3.30. Paragraph 288c(3). Altitude at the Fix.** Round altitudes to the nearest 20-foot or 100-foot increment, as applicable.

**A3.31. Paragraph 288c(4)(a).** USAF N/A when an operational requirement exists and waiver action is not required. Justify GPD violation by entering the operational requirement.

**A3.32. Paragraph 289 OBSTACLES CLOSE TO A FINAL APPROACH OR STEPDOWN FIX.** Comply with FAA Order 8260.19, paragraph 8-57.f.(1); chart only the highest obstacle in the 7:1 area on the approach plate.

**A3.33. Paragraph 293 OBSTACLE CLEARANCE.** Use the appropriate speed group as specified in FAA Order 7130.3, paragraph 2-28 when a climb-in-hold evaluation is necessary. Use the template required for the climb-in-hold assessment for the level holding evaluation. Select a higher template number for the evaluation when the required template size does not encompass the ending width of the segment at the holding fix.

**A3.34. Paragraph 3 1 Establishment.** Do not establish or publish alternate minima for AF procedures. Alternate minima are given in AFI 11-202V3, or as supplemented by each MAJCOM. Publish takeoff minimums (a ceiling and visibility) for civil aircrews to see and avoid obstructions whenever a DP is published for civilian use to include joint civil-military use IAW FAA Order 8260.3, Volume 4, paragraph 1.4.6. **Note:** Reference the Civil Reserve Air Fleet (CRAF) and other DOD contracted civil aircraft; provide takeoff minimums only when notified by the carrier that takeoff minimums are required.

**A3.35. Paragraph 3 2.2b Precipitous terrain adjustments.** Do not apply precipitous terrain adjustments to AF instrument procedures, including FTIP.

**A3.36. Paragraph 3 3.2** Manually calculate visibilities IAW this section using Table 3-5a from FAA Order 8260.3b, Change 23. GPD is programed with an earlier version of this table and may not output the correct visibility values. Continue to manually check GPD visibility values until the software is upgraded (Service Pack 9) to comply with this newer guidance.

**A3.37. Paragraph 3 3.2c.(2)(b).** Restrict night operations when the 20:1 OIS is penetrated and the VGSI is not operating or not installed. Night operations may continue unrestricted when a VGSI is installed and operating and the location of the penetrating obstacle(s) is indicated on the approach chart or in the FTIP review. For straight-in approaches, reference the location of the obstacle to the course. For circling approaches, reference the location of the obstacle to the runway centerline. Apply the following whenever the 20:1 OIS is penetrated and the penetrating obstacle(s) cannot be marked and lighted or it is not known if the penetrating obstacles are marked and lighted. **Note:** The VGSI system may be set at an angle as low as 2.5°. Reference FAA Order 8260.3, Change 20, paragraph 3.3.2d.(2)(d), the VGSI OCS clearance verification may be obtained from Civil Engineer personnel. Do not include the horizontal or vertical accuracy values when publishing the height and location of the 20:1 OIS penetration(s) in any FLIP (DOD, FAA or Jeppesen®) document.

A3.37.1. *When a VGSI system is installed*, the approach chart or FTIP review must be annotated to indicate the height and location of the unlit 20:1 OIS penetration(s) located in the STRAIGHT-IN or in the OFFSET visual area. Example note:

**"Unlit antenna 86′ AGL/1820′ MSL, 2430′ prior to threshold, 170′ right of course"**

A3.37.1.1. Chart the following required note to indicate to all users the straight-in approach procedure and circling to the runway is not authorized at night:

**"When VGSI inop, procedure NA at night"**

A3.37.1.2. *USAF exception*: Chart the following note to inform USAF aircrews that the approach may be used to land straight-in at night only after they have requested and received approval from their MAJCOM A3 (or equivalent):

**"USAF Only: When VGSI inop, straight-in RWY XX authorized at night with MAJCOM A3 approval"**

A3.37.1.3. Whenever circling minimums are published and one or more runways have 20:1 OIS penetrations, chart the following note to inform the pilot that circling to each of the affected runways is not authorized at night when the VGSI is inoperable:

**"CAUTION: When RWY** (XX, XY, XZ, as applicable) **VGSI inop, circling to RWY** (XX, XY, XZ, as applicable) **NA at night"**

A3.37.2. *When a VGSI is not installed or when unable to determine whether or not a VGSI is installed*, the requirements in paragraph A3.23.1 remain the same. The approach chart or FTIP review must be annotated to indicate the height and location of the unlit 20:1 OIS penetration(s). Example note:

**"Unlit steeple 190′ AGL/2270′ MSL, 2950′ prior to threshold, 185′ left of** (course/centerline)**"**

A3.37.2.1. In this case, chart the following required note to indicate to all users the straight-in approach procedure and circling to the runway is not authorized at night:

**"Procedure NA at night"**

A3.37.2.2. *USAF exception*: Chart the following note to inform USAF aircrews that the approach may be used to land straight-in at night only after they have requested and received approval from their MAJCOM A3 (or equivalent):

**"USAF Only: Straight-in RWY XX authorized at night with MAJCOM A3 approval"**

A3.37.2.3. Whenever circling minimums are published and one or more runways have 20:1 OIS penetrations, chart the following note to inform the pilot that circling to each of the affected runways is not authorized at night:

**"CAUTION: Circling to RWY** (XX, XY, XZ, as applicable) **NA at night"**

A3.37.3. When charting the notes in paragraphs A3.23.1 and A3.23.2 and numerous like obstacles need to be annotated, group the obstacles in the note as in this example:

**"Unlit Terrain/Trees/Towers** (as applicable) **beginning 1245′ prior to threshold, 250′ left of** (course/centerline)**, up to 2910′ MSL"**

A3.37.4. Night operations are authorized without the notes described in paragraphs A3.23.1 and A3.23.2 when the TERPS evaluation confirms there are no penetrations to the 20:1 OIS.

A3.37.5. Whenever Category A minima are affected by penetrations to the 20:1 or 34:1 OIS, also apply the notation requirements in FAA Order 8260.19, paragraph 8-54. i. (3).

**A3.38. Paragraphs 413a(2), 513a(2)*(b)*, 613a(2), and 713a(2)*(b)*; Circling Approach.** Circling approach alignment criteria, using on-airport facilities, permits the use of all radials (360°). The AF does not recognize the requirement for the final approach course to be aligned to (pass through or over) any portion of the usable landing surface. This criterion is applicable to on-airport VOR (no FAF); TACAN, VOR/DME, and VOR with FAF; NDB on-airport (no FAF); and NDB with FAF circling procedures.

**A3.39. Paragraph 523b. Arc Final Approach.** Do not apply.

**A3.40. Paragraphs 613c(1); Obstacle Clearance. Straight-In.** NDB procedures with no FAF developed using the reduced ROC of 300 feet (military exception) shall have the following note published in the planview: **NOT FOR CIVIL USE.** Do not publish this note on NDB procedures developed using the standard ROC of 350 feet unless required for a different reason.

**A3.41. Paragraph 713c(1); Obstacle Clearance. Straight-In.** NDB procedures with a FAF developed using the reduced ROC of 250 feet (military exception) shall have the following note published in the planview: **NOT FOR CIVIL USE.** Do not publish this note on NDB procedures developed using the standard ROC of 300 feet unless required for a different reason.

**A3.42. Appendix 5, paragraph 1 APPROACH LIGHTING SYSTEMS.** The sequenced flashers are part of the approach lighting system but are not considered when applying credit for approach lights to instrument procedure visibility minima. Inoperative sequenced flashers do not affect published visibility minima.

A3.42.1. When Runway Alignment Indicator Lights (RAIL) are part of the approach lighting system (Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights [MALSR] and Short Simplified Approach Lighting System with Runway Alignment Indicator Lights [SSALR]) and the RAIL portion of the system becomes inoperative, revert to no-light visibility minima.

A3.42.2. The AF does not apply the INOPERATIVE COMPONENTS OR VISUAL AIDS TABLE found on the inside of the front cover of the FAA FLIP. Ensure ALS inoperative notes are charted when applying credit for approach lights to instrument procedure visibility minima. This policy applies to all instrument procedures developed by the AF and published in the DOD FLIP (Terminal) and to all FTIP reviewed by the AF for publication in the DOD FLIP (Terminal) or for posting to GDSS (paragraph 3.19). Figure 6.1 provides sample ALS inoperative notes and implement the intent of FAA Order 8260.19, paragraph 8-54.m.(3).

***Section A3B–Clarification of FAA Order 8260.3, Volume 3***

**A3.43. Paragraphs 1. 2.14, 1.2.15, and 2.11; Obstacle Free Zones (OFZs).** FAA imaginary surfaces do not apply to AF airfields; therefore AF locations do not have runway, inner approach, or inner transitional OFZs. Do not restrict approach minimums based on any FAA imaginary surface penetration.

**A3.44. Paragraph 2 5; MAXIMUM AUTHORIZED GPA'S.** Except for LNAV/VNAV GPA's, apply Vol I, Chapter 3, Table 3-4 to determine the minimum and maximum allowable GPA's and minimum HATh for precision and APV approach procedures. The use of any GPA value outside the values in Table 3-4 and the use of any HATh value lower than the minimum values from Table 3-4 requires waiver. **Note:** See paragraph A3.48 for LNAV/VNAV GPA limitations.

**A3.45. Paragraph 2 6.1; Category I Threshold Crossing Height (TCH) Requirements.** WCH violations may be justified in GPD by publishing a caution note on the IFP and in the IFR Supplement listing all affected aircraft types from the applicable height group(s) from Table 2-3 and the nonstandard WCH(s). Sample note: **CAUTION: ILS Rwy 21; B-747/767/777, L-1011, DC-10, A-300, B-1, KC-10, E-4, C-5 and VC-25 Wheel Crossing Height 18 ft.** Waiver action is not required. **Note:** GPD will be upgraded to automatically generate the proper caution note in a future version.

**A3.46. Paragraph 2 9; DETERMINING PFAF/FAF COORDINATES.** The formula in paragraph 2.9 provides a distance from the PFAF to the GPI. To obtain a distance from the LTP to the PFAF, subtract the GPI distance from distance "D" (D-GPI). The formula in paragraph 2.9 also incorporates the altitude loss (z) between the PFAF elevation and the elevation of the LTP. The elevation of the LTP is the elevation of the threshold (and ASBL). The calculation based on "z" and a given GS angle will provide a distance from the PFAF to a point where an altitude loss equal to "z" has occurred. This point will be beyond the threshold where the GS intersects the ASBL; the GPI point.

**A3.47. Paragraph 2 12; GLIDEPATH QUALIFICATION SURFACE (GQS).** When GPD determines a GQS penetration, manually apply FAA Order 8260.3, Change 21, Volume 3, paragraph 2.11 until Change 21 is incorporated into GPD. When a manual evaluation results in no GQS penetrations or in allowable GQS penetrations, document the results in the Approach Procedure Design Notes. Allowable GQS penetrations for the AF shall have an effective height at or below a 50:1 surface (a grade of 2.0 %). When evaluating the GQS for CAT III operations, the GQS will extend from the runway threshold to a DA point that is equivalent to a 100 foot HATh.

**A3.48. Paragraph 3 3; PRECISION OBJECT FREE AREA (POFA).** The term "precision obstacle free area (POFA)" has been changed to "precision obstacle free zone (POFZ)." The shaded area in Figure A3.1 is the POFZ (800 feet wide centered on runway centerline, extending 200 feet past threshold) and must be evaluated by TERPS to protect aircraft executing a missed approach.

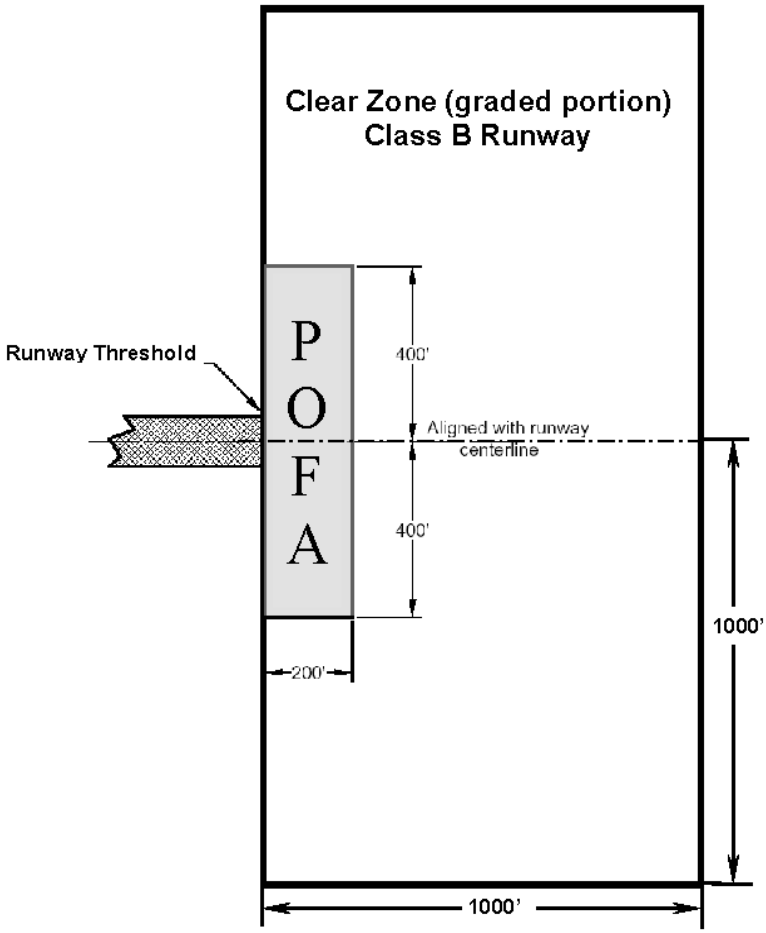
A3.48.1. For unrestricted instrument procedures, no above ground objects, regardless of frangibility, are permitted in the POFZ except for taxiing aircraft or taxiing aircraft holding temporarily and those required for air navigation or aircraft ground maneuvering purposes. **Note:** Reference taxiing or holding aircraft, only horizontal surfaces (e.g., aircraft wings) can penetrate the POFZ, but not the vertical surfaces (e.g., fuselage or tail).

A3.48.2. Parked aircraft (i.e., parking ramps, arm and de-arm areas, hot brake areas, etc.) and those deviations permitted by UFC 3-260-01, Appendix B, Section 13, paragraph B-13-2, that cannot be classified as "necessary for air navigation or aircraft ground maneuvering" (i.e., maintenance facilities, barrier shacks, etc.) are not permitted in this area without incurring TERPS penalties. When the area is not clear of permissible above ground obstacles or objects or when parking spots, arm and de-arm areas, hot brake areas, etc. are designated within the POFZ, *do not publish* HATh and visibility for CAT I precision approaches (i.e., PAR, ILS, MLS, etc.) less than 250 feet and ¾ statute mile respectively.

A3.48.3. When the POFZ cannot be protected or is not being protected by ATC IAW FAA Order 7110.65, and obstacles have been added to the database in the POFZ, ensure the "HAT

due to POFA Penetrations" box is checked in the Precision Final Segment Properties window of GPD. This will ensure the TERPS penalty to the HATh and visibility are applied.

**Figure A3.2. Portion of Clear Zone Affecting CAT I Minimums.**




**A3.49. Paragraph 3 8. ADJUSTMENT OF DA FOR FINAL APPROACH OCS PENETRATIONS.** Application of this method need not require a DA that is more than 250 feet above the penetrating obstacle; however, the minimum HATh is 250 feet.

**A3.50. Paragraph 4 0; GENERAL.** Glidepath angles below 2.70° and above 3.80° are nonstandard and require waiver.

***Section A3C–Clarification of FAA Order 8260.3, Volume 4***

**A3.51. Paragraph 3 8.2, Climb to Intercept a Course** and **Paragraph 3.8.4, Figure 3-11 illustrates multiple turns more than 90°.** Apply this criteria to all departures with turns equal to or greater than 90° regardless of the number of turns. All lead points must be established to provide only a 2 NM lead. When establishing a lead point using a crossing radial, the angle of divergence between the crossing radial and the departure course shall not be less than 45°. When establishing a lead point using DME, the angle of divergence between the DME facility and the departure course shall not exceed 23°. **Note:** USAF GPD will not construct or evaluate the obstacle clearance area properly when establishing nonstandard lead points greater than 2 NM.

Manual development of the inside turn expansion area and a manual obstacle evaluation IAW AFMAN 11-226 (I), Vol 4, Chapter 3, paragraph 3.8 is required.

***Section A3D–Category II/III ILS Precision Minima Criteria***

**A3.52. Category II/III ILS Precision Minima Requirements.** FAA Order 6750.24D, *Instrument Landing System and Ancillary Electronic Component Configuration and Performance Requirements* applies. USAF GPD is also applying the FAA Memorandum (referenced in Table A3.1), Subject: Interim Criteria for Precision Approach Obstacle Assessment and Category II/III Instrument Landing System (ILS) Requirements, 16 August 2011, as amended in the following sub-paragraphs. This FAA Memorandum is supplemented below and may be viewed at: **http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/afs400/afs420/policies_guidance/memo_TILS/media/Interim_Criteria_for_Precision_Approach_Obstacle_Assessment_Category_II-III_ILS_Req.pdf**.

A3.52.1. Paragraph 2.0, ACCEPTABLE OBSTACLES. Use Table A3.1 to determine whether a penetrating obstruction can be considered acceptable.

A3.52.1.1. When an obstruction penetrates the final approach W and X surfaces, ***AND*** is not considered acceptable; CAT II minimums are not authorized.

A3.52.1.2. When an obstruction penetrates the missed approach section 1 surfaces (except surface A1 extended) ***AND*** is not considered acceptable, adjust the DA in accordance with the FAA Memorandum, paragraph 6.8.

A3.52.1.3. When an obstruction penetrates the missed approach section 1 surfaces (except surface A1 extended), ***AND*** is not considered acceptable, ***AND*** cannot be mitigated by adjusting the DA, CAT II minimums are not authorized.

A3.52.2. Paragraph 6.9.1, Section 1.

A3.52.2.1. The area begins at the end of the final OCS trapezoid and is aligned with a continuation of the final approach course, continuing in the direction of landing for a distance of 9,200 feet, excluding extensions.

A3.52.2.2. It is comprised of 5 surfaces; surface A, surface B, surface C, surface D, and surface A1. Surfaces A, B, C, and D must not be penetrated unless the penetrating obstacle is either deemed acceptable per Table A3.1, or mitigated by raising the DA.

A3.52.2.3. Surface A1 or Surface A1 ***extended*** must not be penetrated, unless the penetrating obstacle is either deemed acceptable per Table A3.1, or the procedure is published with a missed approach climb gradient.

A3.52.2.4. Use the variable definitions and formulas listed in the FAA Memorandum, paragraph 6.9.1 to calculate the MSL height of the OCS at any given distance (X) from threshold and (Y) from runway centerline.

A3.52.3. Paragraph 7.2, MINIMUMS. When applying Chapter 7, the minimum RVR value shall be ≥ 200 meters.

**Table A3.1. Acceptable Obstruction Decision Matrix.**

| TYPE OBSTACLE | LOCATION | EXCLUSION AUTHORIZED |
|---|---|---|
| Visual Navigation Aids:<br>• VGSI (PAPI, PVASI, VASI, etc.)<br>• Approach light systems<br>• REILS<br>• Airport beacon<br>• Visual Landing Aids (Wind Cone, etc.)<br><br>Airport signage | Final Approach:<br>• Primary W and X Surfaces<br>Missed Approach Section 1:<br>• A Surface<br>• B Surface<br>• C Surface<br>• D Surface<br>• A1 Surface | *Only when installed IAW the applicable siting standard:*<br>• *FAA Order 6850.2 or*<br>• *AC 150/5340-30 or*<br>• *UFC 3-260-01, etc.* |
| Electronic NAVAIDs and associated components (1):<br>• ILS Glide Slope Shelter<br>• PAR components<br>• Radar reflectors on frangible mounts<br><br>Glide Slope Antenna (2)<br><br>Localizer Antenna serving opposite runway (3) | Final Approach:<br>• Primary W and X Surfaces<br>Missed Approach Section 1:<br>• A Surface<br>• B Surface<br>• C Surface<br>• D Surface<br>• A1 Surface | (1) *Only when installed IAW the applicable siting standard:*<br>• *AC 150/5340-30 or*<br>• *UFC 3-260-01, etc.*<br><br>(2) *Only when the installation meets requirements in the FAA Memorandum, paragraph 2.2.1.*<br><br>(3) *Only when the installation meets requirements in the FAA Memorandum, paragraph 4.0.* |
| Meteorological Equipment:<br>• Cloud height sensors<br>• Visibility sensors<br>• Wind sensors<br>• Temperature/dew point sensors<br>• Lightning Detection sensor<br>• Precipitation sensors<br>• Pressure sensors<br>• AWOS/ASOS components<br><br>Runway Visual Range (RVR) components | Final Approach:<br>• Primary W and X Surfaces<br>Missed Approach Section 1:<br>• A Surface<br>• B Surface<br>• C Surface<br>• D Surface<br>• A1 Surface | *Only when installed IAW the Federal Standard for Siting Meteorological Equipment at Airports, other applicable FAA standards or UFC 3-260-01.* |
| Taxiing, holding and parked aircraft | Missed Approach Section 1:<br>• B Surface<br>• C Surface<br>• D Surface<br>• A1 Surface | *Only when the obstacle meets the requirements in the FAA Memorandum, paragraph 2.3.* |

**A3.53. Paragraph 2 1.3; Diverse "B" Area.** Use the following formula when calculating the OCS MSL elevation at the obstacle (AF GPD is applying this formula):

**Figure A3.3. Formula.**

$$h = {}^{d}/_{40} + e$$

Where h = OCS MSL elevation at the obstacle
d = distance (ft) from obstacle to DRP
e = ICAE MSL elevation

**A3.54. Paragraph 4 6; LNAV/VNAV MISSED APPROACH SEGMENT.** The first fix after DA may be located beyond 5 NM when required to meet minimum RNAV leg lengths as determined by FAA Order 8260.54.

**A3.55. Paragraph 3 2; POSITIVE COURSE GUIDANCE (PCG) DEPARTURE, 15° OR LESS.** Calculating Obstruction Area Half Widths. Apply the values from **Table A3.2** to the following formulae when calculating the obstruction primary area half-width (½$W_p$), and the width of the secondary areas ($W_s$). **Note:** AF GPD is applying these formulae.

**Figure A3.4. Formulae.**

$$\frac{1}{2}W_p = k_p \times D + A$$
$$W_s = k_s \times D$$

**Table A3.2. Calculating Obstruction Area Half Widths.**

| ½ Width | $k_p$ | $k_s$ | D | A |
|---|---|---|---|---|
| Dep DR | 0.267949 | none | Distance (ft) from DER | 500′ |
| Localizer | 0.139562 | none | Distance (ft) from ICAE | 3756.18′ |
| NDB | 0.0833 | 0.0666 | Distance (NM) from facility | 1.25 NM |
| VOR / TACAN | 0.05 | 0.0333 | Distance (NM) from facility | 1 NM |

## Attachment 4

## INSTRUMENT PROCEDURE DESIGNER GUIDE

### *Section A4A–GPI, RPI and TCH Computations*

**A4.1. ILS and MMLS Application.** Calculate GPI, RPI, and TCH for ILS procedures IAW FAA Order 8240.52. See Figure A4.1, Figure A4.2, and Figure A4.3 for sample calculations. Factors that influence these computations include the glidepath angle (GPA), runway threshold elevation, glide slope site (ground) elevation, glide slope antenna to threshold distance, and runway crown elevation abeam the glide slope antenna.

A4.1.1. For an existing ILS, enter the appropriate elevation (either site or crown elevation) used during commissioning flight inspection of the ILS system as the Glide Slope "Ground elevation" on the ILS properties page. Also enter this value in Block 40 of FAA Form 7900-6, Instrument Landing System Data Form.

A4.1.2. For a new ILS or a relocated glide slope, ATCALS personnel will provide the elevation to be used for computations. Enter this elevation as the Glide Slope "Ground elevation" on the ILS properties page and in Block 40 of FAA Form 7900-6. In order for GPD to compute the RPI, the crown elevation must be entered on the ILS Supplementary Data tab.

A4.1.3. For MMLS procedures, replace ILS glide slope antenna to threshold distance with MMLS elevation antenna to threshold distance. Add the height of the center of the elevation antenna phase array (normally 5 ft) to the elevation antenna site elevation and use the result in the place of the ILS glide slope antenna elevation.

**Figure A4.1. RPI/GPI/TCH Computations for Runways with Zero Slope**

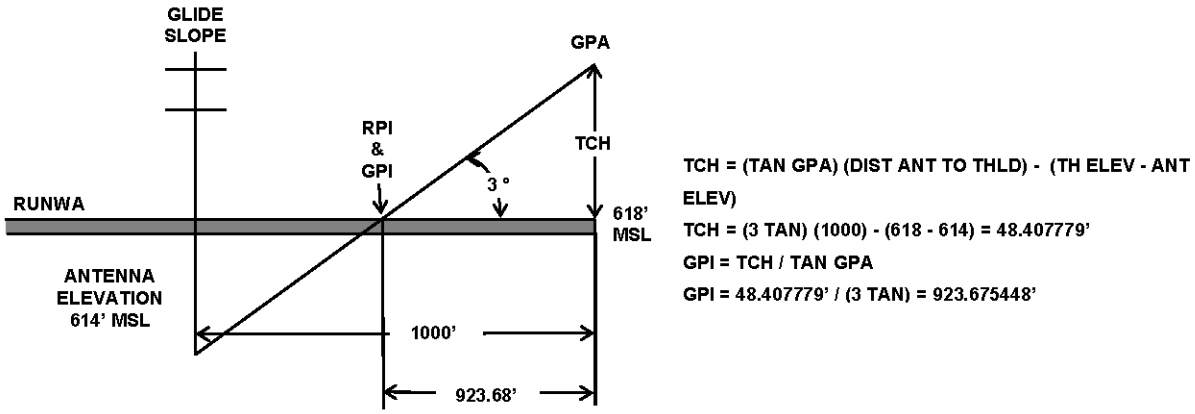


**Figure A4.2. RPI/GPI/TCH Computations for Positive Sloping Runways.**

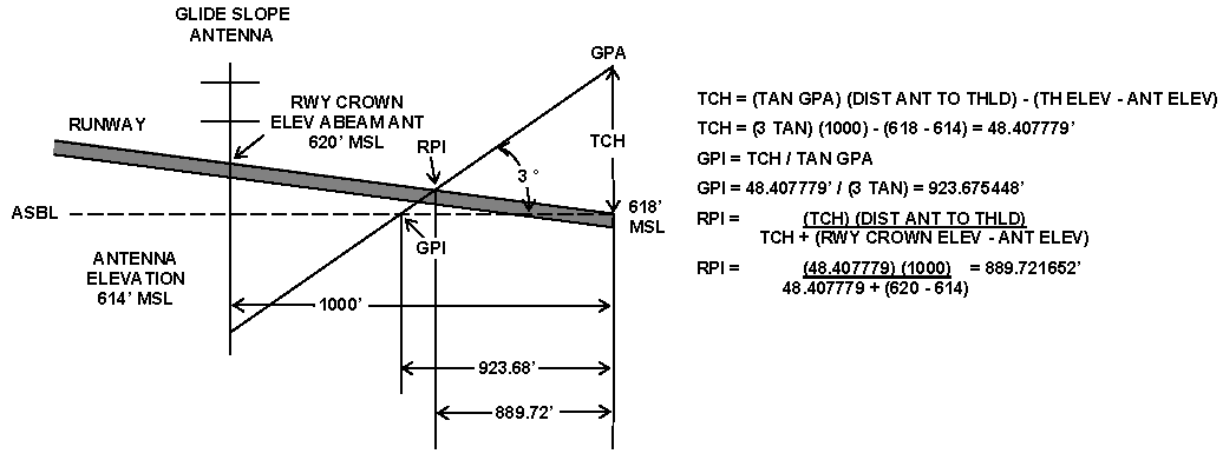
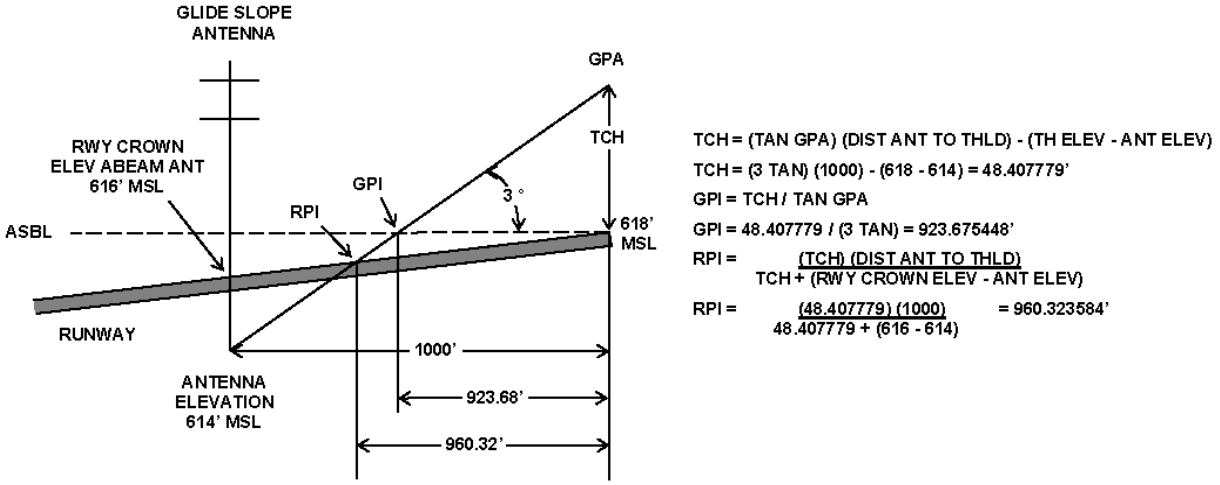



**Figure A4.3. RPI/GPI/TCH Computations for Negative Sloping Runways.**

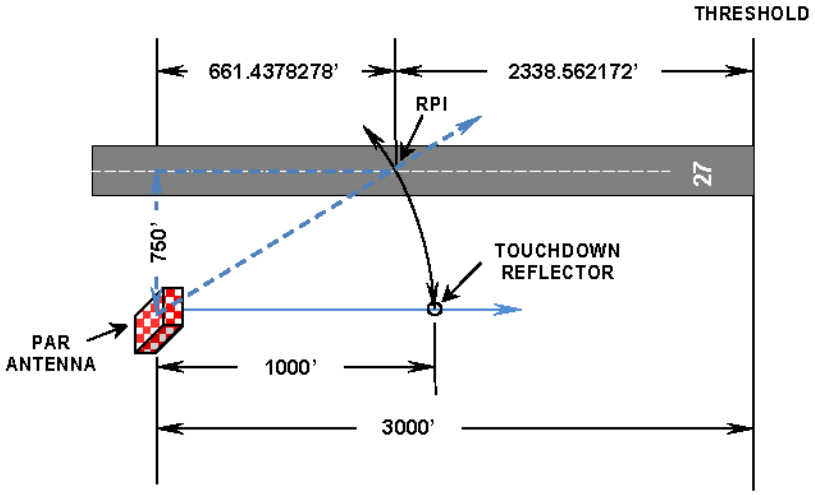



**A4.2. GPN 22/25 and TPN-19 PAR Systems.** Computing RPI is not necessary. The RPI is determined during system installation and should be coincident with the ILS RPI (where an ILS is installed). When no other precision landing aid is installed, the instrument procedure designer will determine RPI to achieve the desired TCH consistent with mission aircraft. The "Touchdown (Kft)" value on the site parameter panel represents the distance from the RPI to the point abeam the PAR antenna, not the distance from the RPI to the threshold. In order to use the correct value for coincidence issues or FAA Form 7900-6 input, ensure the RPI value used is from the threshold.

**A4.3. FPN-62 and MPN-14K PAR Systems.** The RPI (touchdown) is a calculated point on the runway centerline using the requested GS and TCH for the procedure. The touchdown reflector is located at a point on an arc, abeam the runway centerline between the PAR antenna and the threshold where the arc centered on the PAR antenna is swung at a distance equal to the distance from the PAR antenna to the RPI (Figure A4.4). The RPI is determined during system installation and should be coincident with the ILS RPI (where an ILS is installed). When no

other precision landing aid is installed, the instrument procedure designer will determine RPI to achieve the desired TCH consistent with mission aircraft.

**Figure A4.4. PAR RPI (Touchdown) Distance from Runway Threshold.**



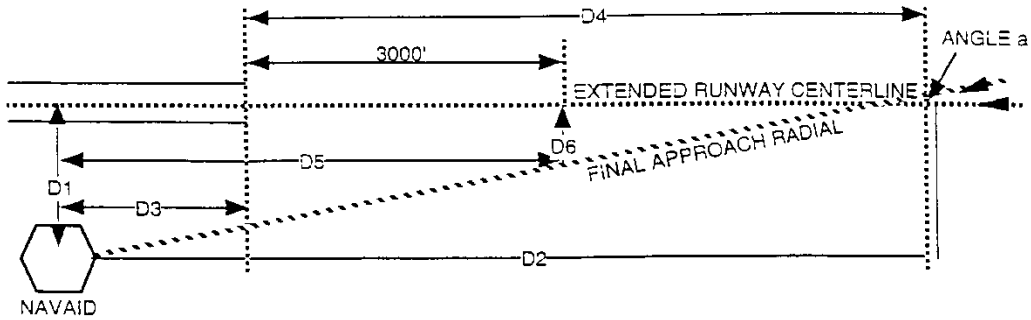

**Note:** This figure is not to scale and provided only to illustrate the relationships between and among the various points involved. The distance from the PAR antenna to the touchdown reflector is equal to the distance from the PAR antenna to the RPI (touchdown).

**A4.4. Threshold Crossing Height (TCH).** The TCH is the height of the glide slope directly above the runway threshold. Normally, this value is computed mathematically for an ILS. Use FAA Order 8260.3, Figure A5-2., to determine the TCH for scanning PAR systems. Use FAA Order 8260.3, Figure A5-3., to determine the TCH for tracking PAR systems.

***Section A4B–Selection of TACAN and VOR Final Approach Radials for On-Airport Facilities***

**A4.5. Alignment Criteria.** Radials selected must meet specified lateral displacement limits relating to extended runway centerlines. The final approach course should be aligned to intersect the extended runway centerline at a point 3,000 feet from the threshold. When operationally required, the course must lie within 500 feet laterally of the extended centerline at a point 3,000 feet outward from the runway threshold. As it is difficult to determine accurate crossover points from drawings, use the following guidance to determine the crossover point, lateral displacement of a radial, or determination of the optimum radial. It is paramount to ensure that engineering maps accurately reflect the location of NAVAIDs (**paragraph** A4.11).

**Figure A4.5. Selecting Final Approach Radial (NAVAID past Threshold).**




**A4.6. Formula Symbology Definitions.**

A4.6.1. Angle a = The difference between the runway heading and final approach course stated in degrees.

A4.6.2. T = Tangent of angle a.

A4.6.3. D-1 = Lateral distance from a point on the runway centerline or extended centerline, stated in feet, measured perpendicularly to the facility, obtained from survey results or engineering maps.

A4.6.4. D-2 = Distance in feet from a point on the runway centerline opposite the facility to the crossover point, derived from calculations explained below.

A4.6.5. D-3 = Distance from a point on the runway centerline opposite the facility to runway threshold. This is a negative value when the facility is located past the threshold (Figure A4.5) and a positive value when the facility is located prior to the runway threshold (Figure A4.6). Obtain this measurement from actual survey or engineering map.

A4.6.6. D-5 = The distance from the facility to a point 3,000 feet from the runway threshold is obtained by adding distance D-3 to 3,000 feet when D-3 is a negative value or by subtracting D-3 from 3,000 feet when D-3 is a positive value.

A4.6.7. D-6 = The lateral displacement distance at 3,000 feet between the extended runway centerline and the final approach radial obtained by the following mathematical calculations.

**A4.7. Determining the Final Approach Radial and the Runway Centerline Crossover Point** (Figure A4.5):

A4.7.1. Step 1. Determine the distance between the facility and the runway centerline (D-1).

A4.7.2. Step 2. Obtain the distance between the facility and the runway threshold (D-3).

A4.7.3. Step 3. Determine the difference between the inbound heading of the extended runway centerline and the inbound heading of the final approach course radial (angle a).

A4.7.4. Step 4. Convert angle a to a tangent.

A4.7.5. Step 5. Divide distance D-1 by the tangent.

**A4.8. Determining the Lateral Displacement of the Final Approach Radial at the Runway Centerline 3,000 Feet from the Runway Threshold.**

A4.8.1. Step 1. Divide distance D-1 by the tangent of the angle a.

A4.8.2. Step 2. Add distance D-3 to 3,000 feet to get distance D-5.

A4.8.3. Step 3. Subtract distance D-5 from distance D-2.

A4.8.4. Step 4. Multiply the result of Step 3 by the tangent of angle a. When the result of this step is 500 feet or less, the radial meets lateral displacement criteria. If it exceeds 500 feet, consider selecting another radial or request a waiver.

**A4.9. Selecting a Final Approach Radial.** By using the following method, a final approach radial can be selected that meets the lateral displacement criteria:

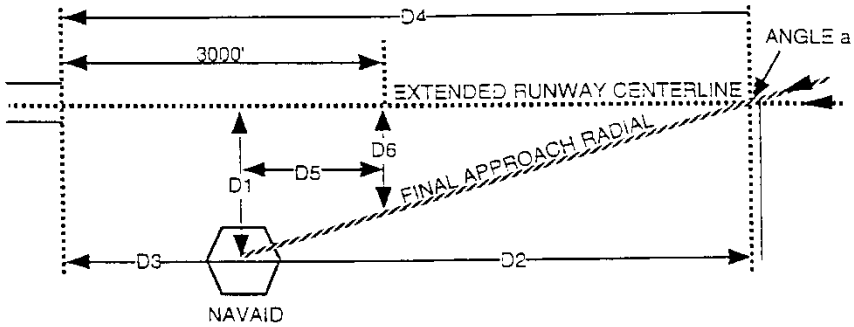
A4.9.1. Step 1. Subtract 500 feet from distance D-1 (Figure A4.5).

A4.9.2. Step 2. Divide the answer in Step 1 by distance D-5 to obtain the tangent of angle a.

A4.9.3. Step 3. Convert the tangent of angle a to degrees. Round up to the next hundredth (.01) of a degree.

A4.9.4. Step 4. When the flight path of the aircraft along the final approach course crosses the extended centerline from right to left as in Figure A4.5, subtract the results in Step 3 from the runway heading. When the aircraft crosses from left to right, add the results in Step 3. If the facility is located in front of the runway threshold as in Figure A4.6, subtract distance D-3 from 3,000 feet in Step 2. The remaining calculations are the same. Reducing the distance subtracted from distance D-1, in Step 1, the approach radial will move closer to the centerline at the 3,000 foot point. As an example, by subtracting 0 feet from D-1 in Step 1, a crossover point is established at 3,000 feet.

**Figure A4.6. Selecting Final Approach Radial (NAVAID prior to Threshold).**




***Section A4C–TERPS Techniques, Formulas and Distance Conversion Guidance***

**A4.10. Determining DME Arc Intercept Angles.** Precision criteria specify a minimum length of the intermediate segment based on the angle of intercept between the initial segment and the localizer course. Use the formulas outlined in FAA Order 8260.3, Volume 3, Chapter 2, General Criteria, to determine this angle.

**A4.11. Determining Points on Maps and Charts.** Since maps do not always accurately depict the Airport Reference Point (ARP), NAVAIDs, fixes, or the locations of some man-made obstacles, the instrument procedure designer must have the ability to manually plot geodetic coordinates or determine the coordinates of a point depicted on a map. When using an engineer's scale to measure distances, the scale affording the greatest accuracy should be used. The scale selected must then be used throughout the operation.

A4.11.1. Plotting Known Geographical Coordinates. Instead of Degrees/Minutes/ Seconds, coordinates are sometimes recorded as Degrees/Decimal minutes. See Table A4.3 for conversion calculations. Example: Plot the ARP coordinates at Myrtle Beach International airport (N 33° 40' 47.10" W 078° 55' 42.00").

A4.11.1.1. Step 1. Locate the latitude and longitude (Lat/Lon) grid rectangle that contains the coordinates to be plotted. Figure A4.7 depicts a 1:250,000 Joint Operations Graphic (JOG). Example: The MYR ARP coordinates are located within the rectangle N 33° 30' 00" W 078° 45' 00" (lower right corner) to N 33° 45' 00" W 079° 00' 00" (upper left corner).

A4.11.1.2. Step 2. Using an engineer's scale, determine the number of seconds per "tick" of latitude and longitude on the scale map being used.

A4.11.1.2.1. Latitude example.

A4.11.1.2.1.1. Measure the distance between two latitudes that make the top and bottom sides of the rectangle determined in Step 1 with the 60 scale on an engineer's scale. Our example uses N 33° 30' 00" and N 33° 45' 00".

A4.11.1.2.1.2. The difference between N 33° 30' 00" and N 33° 45' 00" is 15'. Convert 15' to seconds by multiplying by 60 (15' × 60 = 900").

A4.11.1.2.1.3. The measured distance between N 33° 30' 00" and N 33° 45' 00" is 261 "ticks".

A4.11.1.2.1.4. 261 "ticks" divided by 900" = 0.29 "ticks" per seconds.

A4.11.1.2.2. Longitude example.

A4.11.1.2.2.1. Measure the distance between two longitudes that make the right and left sides of the rectangle determined in Step 1 with the 60 scale on an engineer's scale. Our example uses N 78° 45' 00" and N 79° 00' 00".

A4.11.1.2.2.2. The difference between N 78° 45' 00" and N 79° 00' 00" is 15'. Convert 15' to seconds by multiplying by 60 (15' × 60 = 900").

A4.11.1.2.2.3. The measured distance between N 78° 45' 00" and N 79° 00' 00" is 191 "ticks".

A4.11.1.2.2.4. 191 "ticks" divided by 900" = 0.21222 "ticks" per second.

A4.11.1.3. Step 3. Figure A4.8. Identify a longitude on the Lat/Lon grid close to the longitude of the target coordinate. Along this same longitude line, identify the working latitude close to the latitude of the target coordinate. Add or subtract this latitude value from the target latitude as appropriate. It is generally easier to select the working latitude that is less than the target latitude, but either way is acceptable.

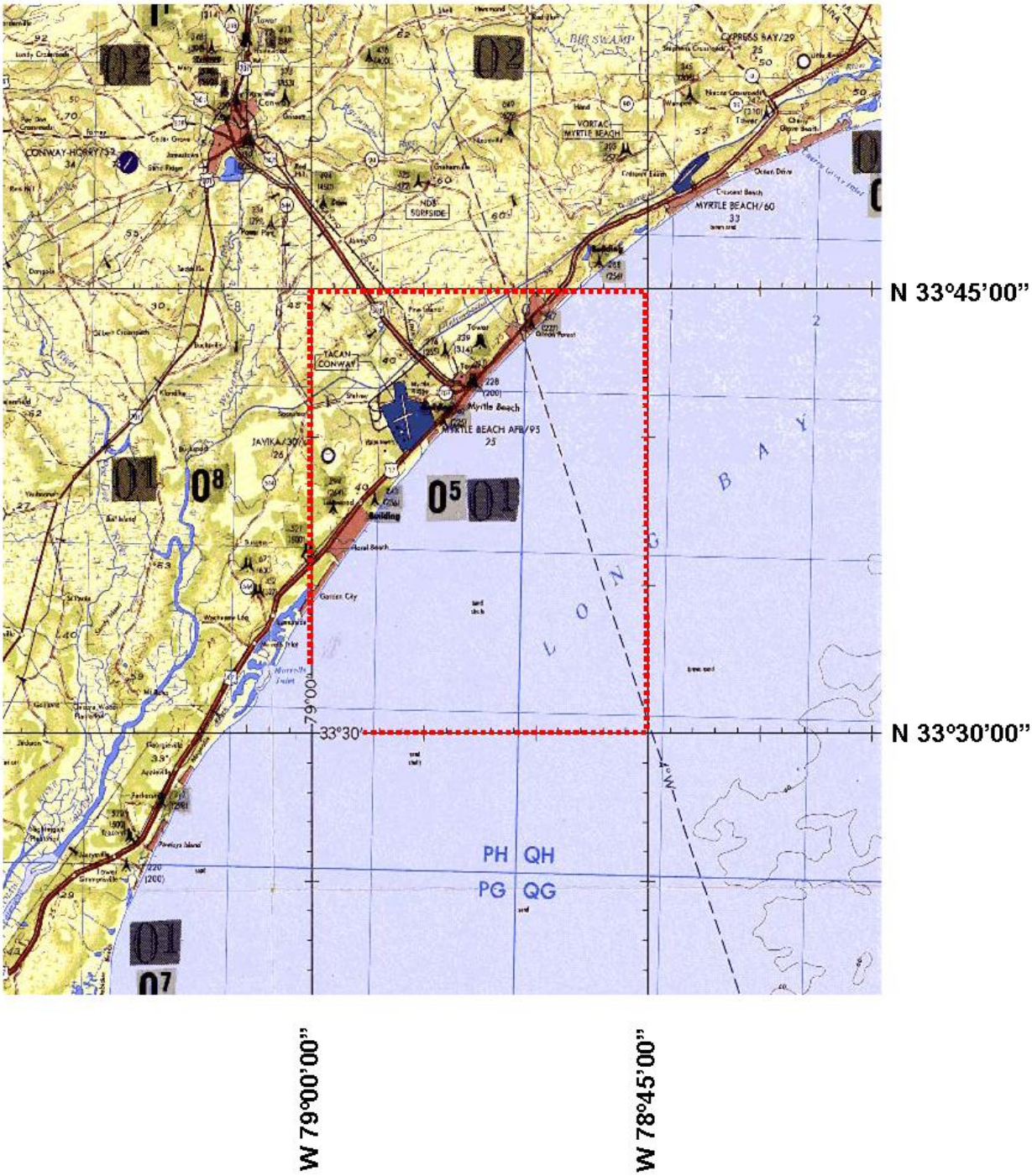
A4.11.1.3.1. Example 1. Working latitude selected is N 33° 40' 00.00". Determine the sum of the difference between the target latitude N 33° 40' 47.10" and the working latitude to determine the number of seconds difference.

$$\begin{array}{r} 33^\circ\ 40'\ 47.10'' \\ \underline{-\ 33^\circ\ 40'\ 00.00''} \\ 47.10'' \end{array}$$

A4.11.1.3.2. Example 2. Working latitude selected in N 33° 41' 00.00". Determine the sum of the difference between the target latitude N 33° 40' 47.10" and the working latitude to determine the number of seconds difference.

$$\begin{array}{r} 33^\circ\ 41'\ 00.00'' \\ \underline{-\ 33^\circ\ 40'\ 47.10''} \\ 12.90'' \end{array}$$

**Figure A4.7. Locating The Latitude (Lat) and Longitude (Lon) Grid Rectangle Containing Target Coordinates**




A4.11.1.4. Step 4. Determine the number of engineer scale "ticks" for the sum determined in Step 3. Measure this distance from the working latitude and mark with a working line perpendicular to the target longitude.

A4.11.1.4.1. Example 1. 47.10" × 0.29 = 13.659 or 14 "ticks" north of N 33° 40' 00".

A4.11.1.4.2. Example 2. 12.90" × 0.29 = 3.741 or 4 “ticks” south of N 33° 41' 00".

A4.11.1.5. Step 5. Figure A4.8. Add or subtract the working longitude value from the target longitude, as appropriate, in the same manner for longitude in Step 3. It is generally easier to select a working longitude that is less than the target longitude, but either way is acceptable.

A4.11.1.5.1. Example 1. Working longitude selected is W 78° 55' 00.00". Determine the sum of the difference between the target longitude W 78° 55' 42.00" and the working longitude to determine the number of seconds difference.

```
  78° 55' 42.00"
- 78° 55' 00.00"
          42.00"
```

A4.11.1.5.2. Example 2. Working longitude selected in W 78° 56' 00.00". Determine the sum of the difference between the target longitude W 78° 55' 42.00" and the working longitude to determine the number of seconds difference.

```
  78° 56' 00.00"
- 78° 55' 42.00"
          18.00"
```

A4.11.1.6. Step 6. Determine the number of engineer scale “ticks” for the sum determined in Step 5.

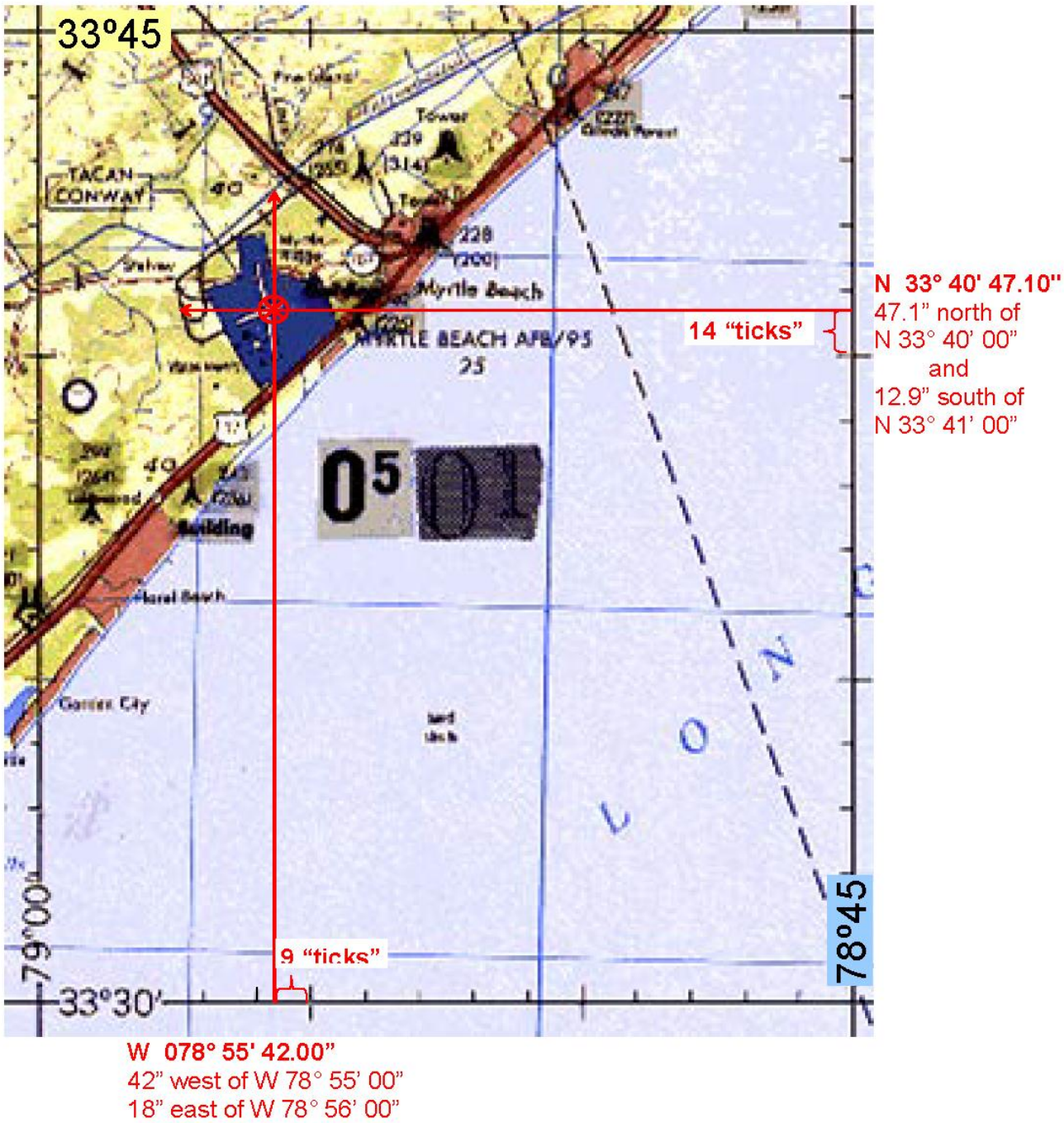
A4.11.1.6.1. Example 1. 42.00" × 0.2122 = 8.9124 or 9 “ticks” west of N 78° 55' 00"

A4.11.1.6.2. Example 2. 18.00" × 0.2122 = 3.8196 or 4 “ticks” east of N 78° 56' 00"

A4.11.1.7. Step 7. Measure this distance from the target longitude and mark with a working line perpendicular to the latitude grid. Mark the intersection of the two working lines. This is the location of the target coordinates (ARP).

A4.11.2. Determining Unknown Geographical Coordinates. The process for determining a set of coordinates for an object or point depicted on a map is the reverse of those steps for plotting known coordinates. Take Steps 1 and 2 as outlined in paragraph A4.11.1. Next draw two working lines through the point, first perpendicular to longitude, then perpendicular to latitude, making sure the lines are long enough to intersect the Lat/Lon grid. Determine the working latitude and longitude by finding the nearest hash mark from the points where the working lines intersect the Lat/Lon grid. Using an engineer’s scale, measure the number of “ticks” between the working lines and the working latitude or longitude. Divide the number of “ticks” by the seconds per “tick” values to determine the number of seconds the point is from the working latitude or longitude. Add or subtract as necessary the seconds from the working coordinates to determine the latitude and longitude.

**Figure A4.8. Measuring Distance from Working Lat/Lon to Target Lat/Lon.**




**A4.12. True Bearing Conversions.** True bearings shown on some engineering maps are depicted as values between 000 and 090, by quadrant. Convert these bearings to true azimuth (relative to true north) for TERPS application. Reference Figure A4.9, convert TRUE BEARING to TRUE AZIMUTH as follows:

A4.12.1. Example. True Bearing N45E

A4.12.1.1. N and E identify the quadrant

A4.12.1.2. 000 plus 045 = 045° true azimuth

A4.12.2. Example. True Bearing S45E

A4.12.2.1. S and E identify the quadrant

A4.12.2.2. 180 minus 045 = 135° true azimuth

A4.12.3. Example. True Bearing S45W

A4.12.3.1. S and W identify the quadrant

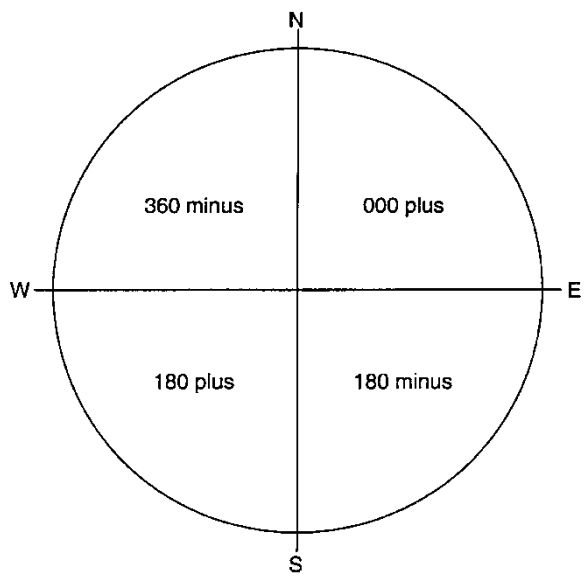
A4.12.3.2. 180 plus 045 = 225° true azimuth

A4.12.4. Example. True bearing N45W

A4.12.4.1. N and W identify the quadrant

A4.12.4.2. 360 minus 045 = 315° true azimuth

**Figure A4.9. True Bearing Conversion Chart.**




**A4.13. True/Magnetic Azimuth Conversions.** East variation indicates that magnetic North is East of True North. West variation indicates that magnetic North is West of True North. Variation applied to a NAVAID or an airfield is referred to as magnetic variation of record.

A4.13.1. To convert true azimuth to magnetic azimuth or magnetic azimuth to true azimuth with East variation, apply the applicable formula from Table A4.1. When the result is greater than 360°, subtract 360° to convert the result to a positive value between 0° and 360°.

**Table A4.1. East Variation.**

| WHEN CONVERTING: | APPLY THE FOLLOWING: |
|---|---|
| **True to Magnetic with East Variation** | **TRUE minus VARIATION equals MAGNETIC**<br>Example: 11° East Variation<br>355° True minus 11° equals 344° Magnetic |
| **Magnetic to True with East Variation** | **MAGNETIC plus VARIATION equals TRUE**<br>Example: 11° East Variation<br>355° Magnetic plus 011° equals 006° True (366° minus 360° equals 006°) |

A4.13.2. To convert true azimuth to magnetic azimuth or magnetic azimuth to true azimuth with West variation, apply the applicable formula from Table A4.2. When the result is greater than 360°, subtract 360° to convert the result to a positive value between 0° and 360°.

**Table A4.2. West Variation.**

| WHEN CONVERTING: | APPLY THE FOLLOWING: |
|---|---|
| **True to Magnetic with West Variation** | **TRUE plus VARIATION equals MAGNETIC**<br>Example: 11° West Variation<br>355° True plus 11° equals 006° Magnetic (366° minus 360° equals 006°) |
| **Magnetic to True with West Variation** | **MAGNETIC minus VARIATION equals TRUE**<br>Example: 11° West Variation<br>355° Magnetic minus 011° equals 344° True |

**Table A4.3. Distance Conversions.**

| EQUIVALENT VALUES | | | |
|---|---|---|---|
| 1 Nautical Mile = 6076.11548 feet | | 1 Nautical Mile = 1.852 Kilometers | |
| 1 Statute Mile = 5280 feet | | 1 Kilometer = 3280.8399 feet | |
| 1 Second of Latitude = 101.268594 feet (avg.) | | 1 Meter = 39.3700787 in./3.2808399 feet | |
| **TO CONVERT** | **TO** | **FUNCTION** | **BY VALUE** |
| Meters (m) | Feet (ft) | Multiply | 3.2808399 |
| | | Divide | 0.3047999 |
| Feet (ft) | Meters (m) | Multiply | 0.3047999 |
| | | Divide | 3.2808399 |
| Meters (m) | Yards (yd) | Multiply | 1.093613298 |
| | | Divide | 0.91439998 |
| Yards (yd) | Meters (m) | Multiply | 0.91439998 |
| | | Divide | 1.093613298 |
| Kilometers (km) | Statute Miles (SM) | Multiply | 0.621371193 |
| | | Divide | 1.609343997 |
| Statute Miles (SM) | Kilometers (km) | Multiply | 1.609343997 |
| | | Divide | 0.621371193 |
| Kilometers (km) | Nautical Miles (NM) | Multiply | 0.539956804 |
| | | Divide | 1.851999995 |
| Nautical Miles (NM) | Kilometers (km) | Multiply | 1.851999995 |
| | | Divide | 0.539956804 |
| Nautical Miles (NM) | Statute Miles (SM) | Multiply | 1.150779447 |
| | | Divide | 0.868976242 |
| Statute Miles (SM) | Nautical Miles (NM) | Multiply | 0.868976242 |
| | | Divide | 1.150779447 |

## A4.14. Miscellaneous Formulas.

A4.14.1. FAF to MAP Calculation: Dist (NM) × 60 ÷ Speed in knots = Time in decimal minutes (i.e., 3.5 = 3 minutes, 30 seconds)

A4.14.2. Rate of Descent: fpm = Ground Speed in Knots × (G/S angle) × 101.2685914 ÷ 57.29577951.

A4.14.3. Coordinates in Degree/Decimal minutes to Degree/Minutes/Seconds: Decimal portion of Minutes × 60 = Seconds.

Example: N 32º 25.69'

.69' × 60 = 41.4"

N 32º 25.69' = N 32º 25' 41.40"

A4.14.4. Coordinates in Degree/Minutes/Seconds to Degree/Decimal Minutes: Seconds ÷ 60 = Decimal minutes plus minutes.

Example: N 78º 13' 43.20"

(43.20" ÷ 60 = .72') plus 13' = 13.72'

N 78º 13' 43.20" = N 78º 13.72'

A4.14.5. To find the length or angle of an arc:

Length = angle × radius ÷ 57.29577951

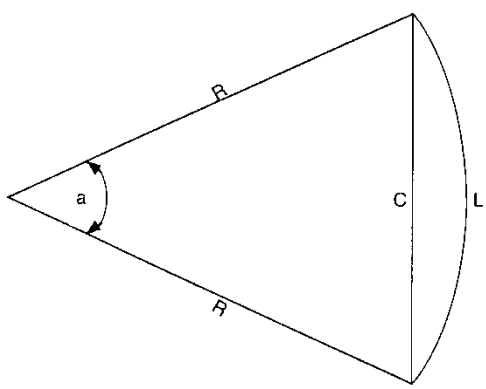
Angle = 57.29577951 × length ÷ radius

A4.14.6. The following formula may be used when it becomes necessary to calculate the straight-line distance between two points on an arc (the Chord) (Figure A4.10):

Chord (C) = 2 R sin (a) ÷ 2

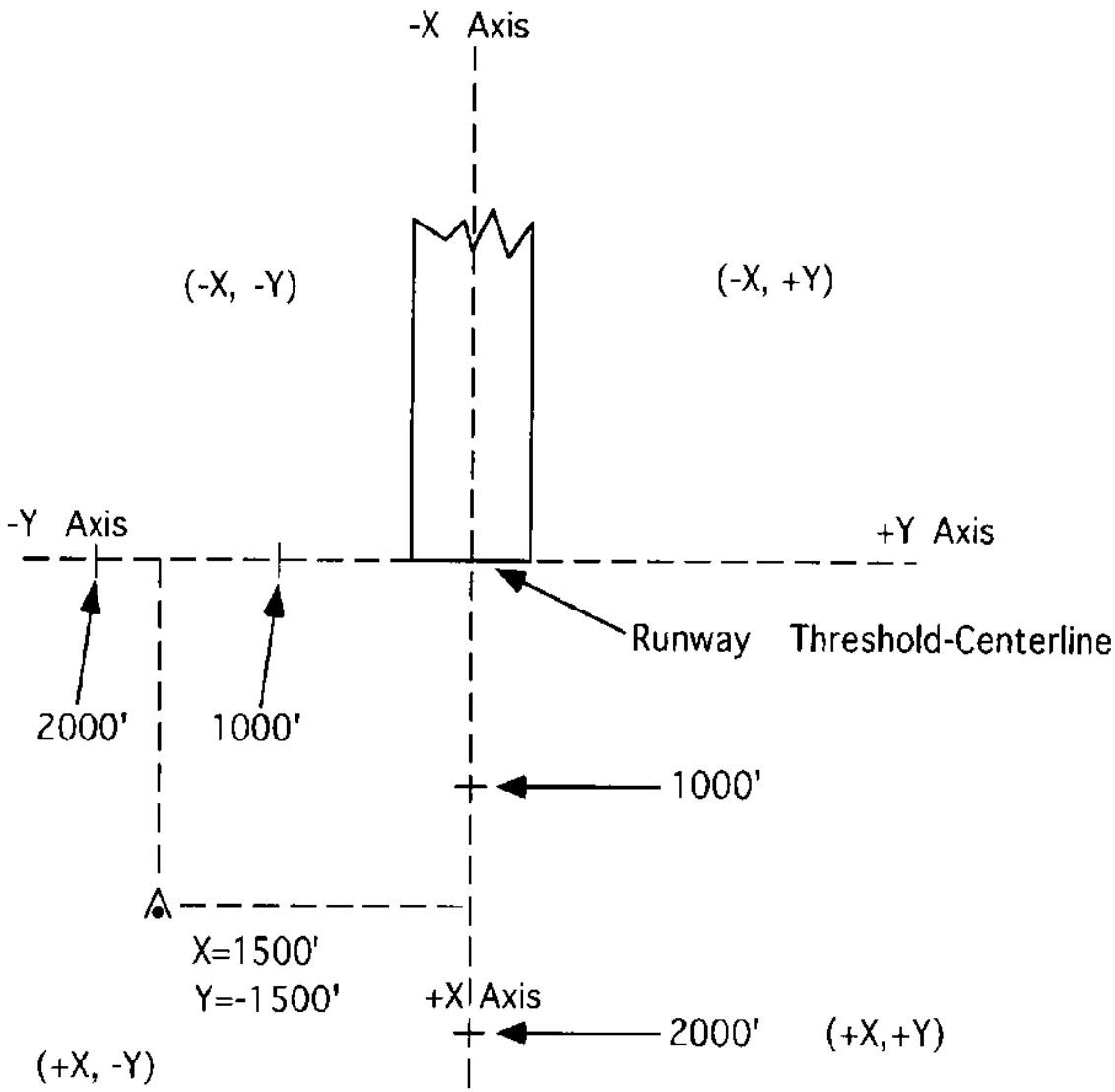
Where: Angle (a) = Number of degrees between radials
Radius (R) = Distance (DME value) of the arc

**Figure A4.10. Straight-Line Distance between Two Points of an Arc.**




**A4.15. Cartesian Coordinates (X-Y axes).** The position of an obstacle or facility can be described by referencing it to the threshold of a runway. Use an engineer's scale and the proper measurement scale from the map to find the coordinate (Figure A4.11).

**Figure A4.11. TERPS Cartesian Coordinate System.**




**A4.16. Calculating the Length of a Teardrop Initial Segment.** Use the formulas in Figure A4.12 to determine the length of the turning portion of a teardrop initial segment.

**Figure A4.12. Length of Teardrop Initial Segment (turning portion only).**

**EXAMPLE:**

**Teardrop Angle: 26 degrees**
**Amount of Turn: 180 + 26 = 206 degrees**
**Turn Point Dist: 20 NM**

**Step 1: Find Teardrop turn radius.**

**Find halfway radial (26/2 = 13 = a).**
**Use turn point distance (20 NM = R).**
**Use formula: 2R sin (a)/2**

**2 x (20) = 40**
**sin (13)/2 = .1124**
**40 x .1124 = 4.499**
**4.499 = r (Teardrop turn radius)**

**Step 2: Find length of turn.**

**Use formula:** $\frac{\text{Angle x Radius}}{57.29577951}$ **= Length**

**Note: Angle (206 dgrees) is the amount of turn required to complete the teardrop.**

$$\frac{206 \times 4.499}{57.29577951} = 16.175 \text{ NM}$$

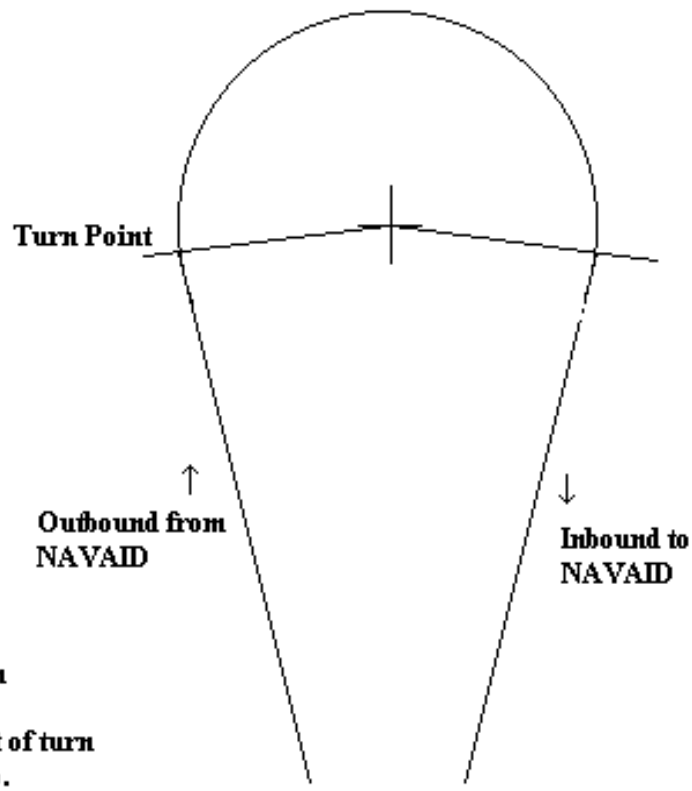



**Table A4.4. RNAV Coordinate Conversion** Table 1

| SECONDS TO TENTHS OF MINUTES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SECONDS | | 10th MINUTE | SECONDS | | 10th MINUTE | SECONDS | | 10th MINUTE |
| 57 – 02 | = | .0 | 15 – 20 | = | .3 | 33 – 38 | = | .6 |
| 03 – 08 | = | .1 | 21 – 26 | = | .4 | 39 – 44 | = | .7 |
| 09 – 14 | = | .2 | 27 – 32 | = | .5 | 45 – 50 | = | .8 |
| | | | | | | 51 – 56 | = | .9 |

**Table A4.5. RNAV Coordinate Conversion** Table 2

| SECONDS AND TENTHS OF SECONDS TO HUNDREDTHS OF MINUTES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10th Sec | 100th Min | | 10th Sec | 100th Min | | 10th Sec | 100th Min | | 10th Sec | 100th Min | |
| 0.00 – 00.2 | = | 0.00 | 14.7 – 15.2 | = | 0.25 | 29.7 – 30.2 | = | 0.50 | 44.7 – 45.2 | = | 0.75 |
| 0.03 – 00.8 | = | 0.01 | 15.3 – 15.8 | = | 0.26 | 30.3 – 30.8 | = | 0.51 | 45.3 – 45.8 | = | 0.76 |
| 0.09 – 01.4 | = | 0.02 | 15.9 – 16.4 | = | 0.27 | 30.9 – 31.4 | = | 0.52 | 45.9 – 46.4 | = | 0.77 |
| 01.5 – 02.0 | = | 0.03 | 16.5 – 17.0 | = | 0.28 | 31.5 – 32.0 | = | 0.53 | 46.5 – 47.0 | = | 0.78 |
| 02.1 – 02.6 | = | 0.04 | 17.1 – 17.6 | = | 0.29 | 32.1 – 32.6 | = | 0.54 | 47.1 – 47.6 | = | 0.79 |
| 02.7 – 03.2 | = | 0.05 | 17.7 – 18.2 | = | 0.30 | 32.7 – 33.2 | = | 0.55 | 47.7 – 48.2 | = | 0.80 |
| 03.3 – 03.8 | = | 0.06 | 18.3 – 18.8 | = | 0.31 | 33.3 – 33.8 | = | 0.56 | 48.3 – 48.8 | = | 0.81 |
| 03.9 – 04.4 | = | 0.07 | 18.9 – 19.4 | = | 0.32 | 33.9 – 34.4 | = | 0.57 | 48.9 – 49.4 | = | 0.82 |
| 04.5 – 05.0 | = | 0.08 | 19.5 – 20.0 | = | 0.33 | 34.5 – 35.0 | = | 0.58 | 49.5 – 50.0 | = | 0.83 |
| 05.1 – 05.6 | = | 0.09 | 20.1 – 20.6 | = | 0.34 | 35.1 – 35.6 | = | 0.59 | 50.1 – 50.6 | = | 0.84 |
| 05.7 – 06.2 | = | 0.10 | 20.7 – 21.2 | = | 0.35 | 35.7 – 36.2 | = | 0.60 | 50.7 – 51.2 | = | 0.85 |
| 06.3 – 06.8 | = | 0.11 | 21.3 – 21.8 | = | 0.36 | 36.3 – 36.8 | = | 0.61 | 51.3 – 51.8 | = | 0.86 |
| 06.9 – 07.4 | = | 0.12 | 21.9 – 22.4 | = | 0.37 | 36.9 – 37.4 | = | 0.62 | 51.9 – 52.4 | = | 0.87 |
| 07.5 – 08.0 | = | 0.13 | 22.5 – 23.0 | = | 0.38 | 37.5 – 38.0 | = | 0.63 | 52.5 – 53.0 | = | 0.88 |
| 08.1 – 08.6 | = | 0.14 | 23.1 – 23.6 | = | 0.39 | 38.1 – 38.6 | = | 0.64 | 53.1 – 53.6 | = | 0.89 |
| 08.7 – 09.2 | = | 0.15 | 23.7 – 24.2 | = | 0.40 | 38.7 – 39.2 | = | 0.65 | 53.7 – 54.2 | = | 0.90 |
| 09.3 – 09.8 | = | 0.16 | 24.3 – 24.8 | = | 0.41 | 39.3 – 39.8 | = | 0.66 | 54.3 – 54.8 | = | 0.91 |
| 09.9 – 10.4 | = | 0.17 | 24.9 – 25.4 | = | 0.42 | 39.9 – 40.4 | = | 0.67 | 54.9 – 55.4 | = | 0.92 |
| 10.5 – 11.0 | = | 0.18 | 25.5 – 26.0 | = | 0.43 | 40.5 – 41.0 | = | 0.68 | 55.5 – 56.0 | = | 0.93 |
| 11.1 – 11.6 | = | 0.19 | 26.1 – 26.6 | = | 0.44 | 41.1 – 41.6 | = | 0.69 | 56.1 – 56.6 | = | 0.94 |
| 11.7 – 12.2 | = | 0.20 | 26.7 – 27.2 | = | 0.45 | 41.7 – 42.2 | = | 0.70 | 56.7 – 57.2 | = | 0.95 |
| 12.3 – 12.8 | = | 0.21 | 27.3 – 27.8 | = | 0.46 | 42.3 – 42.8 | = | 0.71 | 57.3 – 57.8 | = | 0.96 |
| 12.9 – 13.4 | = | 0.22 | 27.9 – 28.4 | = | 0.47 | 42.9 – 43.4 | = | 0.72 | 57.9 – 58.4 | = | 0.97 |
| 13.5 – 14.0 | = | 0.23 | 28.5 – 29.0 | = | 0.48 | 43.5 – 44.0 | = | 0.73 | 58.5 – 59.0 | = | 0.98 |
| 14.1 – 14.6 | = | 0.24 | 29.1 – 29.6 | = | 0.49 | 44.1 – 44.6 | = | 0.74 | 59.1 – 59.6 | = | 0.99 |
| | | | | | | | | | 59.7 – 59.9 | = | 1.00 |

**A4.17. Calculating Missed Approach Climb Gradients.** The following guidance applies when there is a penetration of the missed approach obstacle clearance surface and other options (DA or MDA adjustment) are not feasible;

A4.17.1. Within the CONUS use the following formulas for precision missed approach CG:

$$h = Oe - \{DA - [\tan(gpa) \times 1460]\}$$

$$CG = \frac{h}{0.76 \times d}$$

Where: Oe = obstacle MSL elevation + vertical accuracy (for obstacles in the secondary, use equivalent height)
d = shortest distance (NM) from end of Section 1A to the obstruction
gpa = glide path angle

Example: Oe = 1549 feet MSL
DA = 300 feet MSL
gpa = 3.00°
d = 5.26 NM

$$CG = \frac{1549 - (300 - [\tan(3.00°) \times 1460])}{0.76 \times 5.26} = 331.5777861$$

A4.17.1.1. Determine the climb-to-altitude where a standard CG can be resumed in this example by adding the required ROC to the height of the obstacle [ROC = 0.24 (CG × d)].

A4.17.1.1.1. Step 1. Calculate ROC: 0.24 (332 × 5.26) = 419.1168

A4.17.1.1.2. Step 2. Add obstacle MSL elevation (including vertical accuracy) to ROC: 419.1168 + 1549 = 1968.1168

A4.17.1.1.3. Step 3. Round 1968.1168 up to next 100-foot increment: 2000.

A4.17.1.2. Publish the note "**CAUTION: Missed Approach Climb Rate to 2000**" above the minimum climb table.

A4.17.1.3. Determine equivalent height by subtracting the amount of secondary rise at the obstacle measured from the edge of the primary area perpendicular to the missed approach course.

A4.17.2. Within the CONUS use the following formulas for nonprecision missed approach CG:

$$h = Oe - \{MDA - [ROC + Adj]\}$$

$$CG = \frac{h}{0.76 \times d}$$

Where: Oe = obstacle MSL elevation + vertical accuracy (for obstacles in the secondary, use equivalent height)
d = shortest distance (NM) from start of missed approach area

Example: Oe = 1549 feet MSL
MDA = 420 feet MSL
d = 5.26 NM

$$CG = \frac{1549 - (420 - 250)}{0.76 \times 5.26} = 344.9569742$$

A4.17.2.1. Determine the climb-to-altitude where a standard CG can be resumed in this example by adding the required ROC to the height of the obstacle [ROC = 0.24 (CG × d)].

A4.17.2.1.1. Step 1. Calculate ROC: 0.24 (345 × 5.26) = 435.528

A4.17.2.1.2. Step 2. Add obstacle MSL elevation (including vertical accuracy) to ROC: 435.528 + 1549 = 1984.528

A4.17.2.1.3. Step 3. Round 1984.528 up to next 100-foot increment: 2000.

A4.17.2.2. Publish the note "**CAUTION: Missed Approach Climb Rate to 2000**" above the minimum climb table.

A4.17.2.3. Determine equivalent height by subtracting the amount of secondary rise at the obstacle measured from the edge of the primary area perpendicular to the missed approach course.

A4.17.3. Calculating Missed Approach Climb Gradients OCONUS where FAA Order 8260.3 criteria are applied (excludes host nation or locations where the AF exercises TERPS authority when ICAO or NATO criteria are applied). **Note:** When required, apply in CONUS and annotate the approach "**NOT FOR CIVIL USE**."

A4.17.3.1. CAT I precision instrument procedures (applicable only to Section 2). For Section 1 penetrations, only DA adjustments are authorized.

A4.17.3.1.1. Apply the applicable Section 2 missed approach (straight, turning or combination straight and turning) criteria from FAA Order 8260.3, Volume 3, Chapter 3. Calculate the climb gradient using the following formula:

$$CG = \frac{(48D + O) - E}{D}$$

Where: $D$ = NM distance from start point for OCS determination to obstacle position (shortest distance from the obstacle to the 'a-b' line at the end of Section 1).

$O$ = Obstruction elevation (in feet MSL). **Note:** Use equivalent obstruction elevation for obstacles in secondary areas.

$E$ = OCS elevation (in feet MSL) at the end of Section 1.

A4.17.3.1.2. Calculate the climb-to-altitude (CTA) by using the following formula:

$$CTA = (D \times CG) + DA$$

A4.17.3.1.3. Round this result to the higher 100-foot value and publish the rounded value as the altitude where the standard climb rate (200 ft/NM) can be resumed (see example note in A4.17.2.2).

A4.17.3.2. Nonprecision instrument approach procedures.

A4.17.3.2.1. Apply the applicable missed approach criteria from FAA Order 8260.3, Volume 1, Chapter 2, to determine the amount of penetration of the MA surface, in feet.

A4.17.3.2.2. Divide the amount of penetration by the NM distance ‘D’ from the OCS calculations. The resultant value is equal to the difference between the standard OCS and the OCS required to clear the penetrating obstacle.

A4.17.3.2.3. Add 200 to the result of A4.17.3.2.2 and round up to the next 1-foot increment. The resultant value equals the minimum publishable CG to clear the obstruction with the required ROC.

A4.17.3.2.4. Calculate the climb-to-altitude by multiplying the published CG from paragraph A4.17.3.2.3 by the NM distance ‘D’ determined in paragraph A4.17.3.2.2. Add the MDA to the result. Round this result to the higher 100-foot value and publish the rounded value as the altitude where the standard climb rate (200 ft/NM) can be resumed (see example note in paragraph A4.17.2.2).

## Attachment 5

## HOST NATION ACCREDITATION CHECKLIST (PROGRAMS AND AIRPORTS)

**A5.1.** Each checklist item applies to host nation programs and airports except Item 2.

**A5.2.** Each checklist item applies to the accredited category and the special accredited category (paragraph 3.1.3) except for Items 2, 13, and 14.

**A5.3.** Provide documentation for each checklist item IAW **paragraph** 3.2.

| ACCREDITATION CHECKLIST ITEMS | YES | NO | N/A |
|---|---|---|---|
| 1. Is the instrument procedure program or airport managed by authorities from an ICAO Contracting State (member nation) or from a Special Administrative Region (SAR)? | | | |
| 2. Is the instrument procedure program administered by an agency of a country that meets ICAO standards IAW the FAA IASA Program? ***Note:*** *This item does not apply when submitting or revalidating programs for the 'accredited' category or when submitting or revalidating individual airports for the 'special accredited' category.* | | | |
| 3. When a single host nation AIP covers more than one country, are individual instrument procedure program methods and practices clearly discernible for each? | | | |
| 4. When a single host nation AIP covers military and civilian instrument flight procedures, does the AIP specify methods and practices employed by each agency? | | | |
| 5. Is US TERPS, ICAO PANS-OPS, or NATO AATCP-1 utilized for the design of instrument flight procedures, including departure procedures? ***Note:*** *Each criteria or standard is accepted; identify the criteria or standard used.* | | | |
| 6. Is flight inspection performed to standards outlined in ICAO Annex 10 or FAA Order 8200.1, even when performed by a private company or a host government contractor? | | | |
| 7. Have all host declared exceptions to any of the accepted criteria or standards been documented by the host? Have copies been forwarded to HQ AFFSA/A3A for review? | | | |
| 8. Does the MAJCOM TERPS function have an open line of communication with the host nation instrument procedure and aviation data OPR(s) to enhance AIP and instrument flight procedure currency and maintainability? | | | |
| 9. Does the host nation staff for the program or airport being evaluated develop and send NOTAMs when required to ensure host nation published instrument flight procedures remain accurate, current, and useable? | | | |
| 10. Does the MAJCOM TERPS function receive host nation NOTAMs soon enough to ensure corrective action(s) can be taken on FTIP published in the DOD FLIP (Terminal) before the host change is effective? | | | |
| 11. Are host NOTAMs for temporary and permanent changes to FTIP published in the DOD FLIP (Terminal) being incorporated into the US NOTAM system? | | | |
| 12. Does host nation source indicate that coordinates are published in the WGS-84 datum? When 'NO', identify the datum used. When known, document whether the published WGS-84 coordinates are derived via survey or via mathematical conversion. | | | |
| 13. Does the candidate program publish all host nation source documentation (AIP, FLIP data, NOTAMs, etc.) in easily understandable English? ***Note:*** *This item only applies when submitting or revalidating programs for the 'special accredited' category.* | | | |
| 14. Does the host agency conduct a Post Publication review of their published instrument procedures? ***Note:*** *This item only applies when submitting or revalidating programs for the 'special accredited' category.* | | | |
| 15. Based on documented MAJCOM experience, does the instrument procedure program continually demonstrate the ability to develop, publish and maintain instrument flight procedures that are safe, flyable and meet accepted criteria or standards? | | | |

## Attachment 6

## FTIP REVIEW AND PUBLICATION CHECKLIST

### Figure A6.1. FTIP REVIEW and PUBLICATION CHECKLIST.

| CHECKLIST ITEM | CONFORMS TO _____ CRITERIA | | |
|---|---|---|---|
| **MSA** | **YES** | **NO** | **N/A** |
| NAVAID | | | |
| SOURCE | | | |
| | | | |
| **HOLDING PATTERNS** | **YES** | **NO** | **N/A** |
| LEG LENGTH | | | |
| NO COURSE SIGNAL ZONE | | | |
| AIRSPEED REQUIREMENTS | | | |
| | | | |
| **INITIAL SEGMENT** | **YES** | **NO** | **N/A** |
| FIX IDENTIFICATION | | | |
| ALTITUDES | | | |
| TEARDROP ANGLE OF DIVERGENCE | | | |
| ARC LENGTH | | | |
| SEGMENT LENGTH | | | |
| DESCENT GRADIENT | | | |
| LEAD RADIAL | | | |
| COURSE ALIGNMENT | | | |
| SPECIAL NOTES | | | |
| | | | |
| **INTERMEDIATE SEGMENT** | **YES** | **NO** | **N/A** |
| FIX IDENTIFICATION | | | |
| ALTITUDES | | | |
| SEGMENT LENGTH | | | |
| DESCENT GRADIENT | | | |
| LEAD RADIAL | | | |
| COURSE ALIGNMENT | | | |
| SPECIAL NOTES | | | |
| | | | |
| **FINAL SEGMENT** | **YES** | **NO** | **N/A** |
| FIX IDENTIFICATION | | | |
| ALTITUDES | | | |
| SEGMENT LENGTH | | | |
| DESCENT GRADIENT | | | |
| COURSE ALIGNMENT | | | |
| STEPDOWN FIX(ES) | | | |
| MISSED APPROACH POINT LOCATION | | | |
| THRESHOLD CROSSING HEIGHT | | | |
| APPROACH MINIMUMS | | | |
| SPECIAL NOTES | | | |
| | | | |
| **CIRCLING** | **YES** | **NO** | **N/A** |
| RESTRICTIONS | | | |
| SPECIAL NOTES | | | |
| | | | |
| **Date Checklist Completed:**_____ | | | |

| CHECKLIST ITEM | CONFORMS TO _____ CRITERIA | | |
|---|---|---|---|
| **MISSED APPROACH SEGMENT** | **YES** | **NO** | **N/A** |
| COURSE ALIGNMENT | | | |
| CLIMB GRADIENT | | | |
| SPECIAL NOTES | | | |
| REVIEW WORDING OF MISSED APPROACH INSTRUCTIONS | | | |
| | | | |
| **PLANVIEW** | **YES** | **NO** | **N/A** |
| LEGIBILITY | | | |
| RESTRICTIONS | | | |
| SPECIAL NOTES | | | |
| | | | |
| **PROFILE** | **YES** | **NO** | **N/A** |
| LEGIBILITY | | | |
| RESTRICTIONS | | | |
| SPECIAL NOTES | | | |
| | | | |
| **STANDARD TERMINAL ARRIVAL (STAR)** | **YES** | **NO** | **N/A** |
| Starts at high or low en route fix | | | |
| Terminates at a fix depicted on the FTIP | | | |
| | | | |
| | | | |
| | | | |
| **DEPARTURE PROCEDURES** | **YES** | **NO** | **N/A** |
| Has the host established departure procedures for obstacle avoidance? | | | |
| DER CROSSING HEIGHT | | | |
| CLOSE-IN OBSTACLE DEPICTION | | | |
| EARLY TURNS | | | |
| CLIMB GRADIENTS | | | |
| CROSSING ALTITUDES | | | |
| POSITIVE COURSE GUIDANCE | | | |
| SPECIAL NOTES | | | |
| RESTRICTIONS | | | |
| COMPLEXITY (Determine if text depiction, graphic depiction, or both depictions are needed) | **Text** | **Graphic** | **Both** |
| | | | |
| **FLYABILITY CHECK CONCERNS** | **YES** | **NO** | **N/A** |
| Document all instrument procedure designer areas of concern on AF IMT 3992 or AF IMT 3993, as appropriate | | | |
| | | | |
| **MISCELLANEOUS** | **YES** | **NO** | **N/A** |
| Do the primary areas of any segment overlap any Special Use Airspace? | | | |
| **Procedure Designer's Printed Name:**_____ | | | |
| **Procedure Designer's Signature:**_____ | | | |

## Attachment 7

## INSTRUMENT PROCEDURE FLYABILITY CHECK INSTRUCTIONS

**A7.1. Purpose of Flyability Checks and Documentation Requirements.** Instrument procedure flyability checks are flown to ensure instrument procedures are safe, practical, and consistent with good operating procedures. They shall include all segments of the instrument procedure including the missed approach segment and all holding patterns. Flyability checks are documented on AF IMT 3992 or AF IMT 3993 as appropriate. Instrument procedure designer concerns documented on the flyability check IMT should be reviewed before the flyability check is flown. Aircrews shall complete the applicable flyability check IMT (see examples at Figure A7.1, Figure A7.2, and Figure A7.3) and sign. Aircrew comments should be written in the remarks section. Flyability checks are not official flight inspections. Whenever possible, the pilot performing the check should personally debrief the instrument procedure designer responsible for the procedure. Maintain these IMTs with the TERPS procedure package (Table 2.1). See **paragraph** 3.17 for additional guidance when requesting flyability checks at host nation locations.

A7.1.1. All flyability checks should determine whether the procedure is flyable and safe for a current and qualified pilot flying an aircraft equipped with basic IFR instrumentation under instrument meteorological conditions. Flyability checks do not require any special crew qualification or certification unless directed by the flight crew's MAJCOM.

A7.1.2. Flyability checks shall be flown under day VMC. The MAJCOM A3 or a formally designated representative may approve flyability checks at night after ORM considerations when needed to meet mission requirements. While conducting the flyability check, the crew must be vigilant for obstructions, especially those not depicted that could be hazardous. The flyability check should carefully evaluate the final approach course alignment ("desired aiming point") - the pilot should be able to maneuver the aircraft safely from the missed approach point to touchdown.

A7.1.3. Pilots conducting flyability checks at host nation airfields may find it difficult to evaluate the entire procedure. They should be able to assess the probability of satisfactory NAVAID and radio reception, and obstacle and terrain clearance for portions of the instrument procedure that cannot be flown. For example, when the missed approach segment cannot be flown on arrival, an assessment may be made when departing.

A7.1.4. When a flyability check cannot be completed (NAVAID not available or commissioned, lack of locally assigned aircraft to perform the flyability check, etc.) prior to flight inspection, satisfactory completion of a commissioning flight inspection may be substituted for the flyability check requirement. When completed during the flight inspection, ensure the flight inspection pilot addresses any flyability check considerations on the flight inspection report. **Note:** AF IMT 3992 or AF IMT 3993 is not required in this instance.

A7.1.5. When runway markings or course alignment are questionable, request particular attention be given to those aspects of the procedure during the flyability check, and annotate results on AF IMT 3992 or AF IMT 3993.

A7.1.6. The pilot conducting the flyability check should simulate the most restrictive aircraft category and must evaluate the entire procedure. The procedure is acceptable when the pilot conducting this check determines:

A7.1.6.1. The procedure is operationally sound and required aircraft maneuvering is consistent with good operating practices.

A7.1.6.2. Cockpit workload is acceptable for a low time pilot with minimal IFR/IMC experience.

A7.1.6.3. Charts can be easily interpreted and contain proper information.

A7.1.6.4. The procedure ensures safety of flight using the guidance in AFMAN 11-217 or as explained in the procedure.

**A7.2. Human Factors.** Aircrews should consider the following items when conducting the flyability check:

A7.2.1. Complexity. The procedure should be as simple as possible; it should not impose excessive cockpit workload.

A7.2.2. Interpretability. The NAVAID that provides information for the final approach course should be clearly identified. Be aware of NAVAIDs located on or near the final approach course that are not part of the final approach segment; they are often subject to being misinterpreted as part of the IAP. The depicted procedure should clearly indicate to which runway(s) a circling approach can be made, and what areas, if any, cannot be used during the circling maneuver.

A7.2.3. Memory Considerations. An aeronautical chart is a storehouse of information. The aircrew must be able to extract information quickly and accurately, so evaluate whether essential data can be quickly and easily found and deciphered.

**Figure A7.1. Sample AF IMT 3992, Instrument Procedure Flyability Check Instrument Approach Procedure (IAP).**

**INSTRUMENT PROCEDURE FLYABILITY CHECK**
**INSTRUMENT APPROACH PROCEDURE (IAP)**

| LOCATION | DATE CHECK FLOWN |
|---|---|
| Anywhere AFB, FL | 20040720 |
| NAME OF PROCEDURE | TYPE AIRCRAFT |
| TACAN or ILS RWY 36R | C-17 |

**METHOD** *(Check one)*

☒ LIVE *(Actually Flown)* ☐ SIMULATOR ☐ TABLE TOP REVIEW ONLY

**NOTE: PLEASE REFER TO AFMAN 11-230, ATTACHMENT 9, PARAGRAPHS A9.1 THROUGH A9.5 FOR GUIDANCE/METHODS TO BE FOLLOWED BEFOR CONDUCTING THIS FLYABILITY CHECK.**

**SEGMENTS NOT FLOWN OR CHECKED SHALL BE ANNOTATED "NF" IN THE "REMARKS" COLUMN. ITEMS THAT ARE NOT APPLICABLE SHOULD BE MARKE "NA". EACH MUST BE MARKED OR ANNOTATED.**

**1. INITIAL APPROACH FIX (IAF) HOLDING PATTERN.** TERPS SPECIALIST COMMENTS/CONCERNS *(Continue on separate sheet of paper):*

Holding pattern designed to accomodate speeds up to 310 KIAS. If possible, evaluate holding pattern at this speed.

| INITIAL APPROACH FIX *(IAF)* HOLDING PATTERN | SAT | UN SAT | REMARKS | INITIAL APPROACH FIX *(IAF)* HOLDING PATTERN | SAT | UN SAT | REMARKS |
|---|---|---|---|---|---|---|---|
| A. ENTRY | ☒ | ☐ | | D. MANEUVERING | ☒ | ☐ | |
| B. LEG LENGTH | ☒ | ☐ | | E. SPEED RESTRICTIONS | ☒ | ☐ | |
| C. NAVAID RECEPTION | ☒ | ☐ | | F. ATC COMMUNICATIONS | ☒ | ☐ | |

**2. IAF TO FINAL APPROACH FIX (FAF).** TERPS SPECIALIST COMMENTS/CONCERNS *(Continue on separate sheet of paper)*:

Intermediate segment length is 5 NM. Determine if this segment length is sufficient to configure aircraft after turning on from the 15 DME arc.

| IAF TO FINAL APPROACH FIX *(FAF)* | SAT | UN SAT | REMARKS | IAF TO FINAL APPROACH FIX *(FAF)* | SAT | UN SAT | REMARKS |
|---|---|---|---|---|---|---|---|
| A. CHARTED COURSES/ARCS/ RADIALS, ETC. | ☒ | ☐ | | E. COCKPIT WORKLOAD | ☒ | ☐ | |
| B. ALTITUDES | ☒ | ☐ | | F. NAVAID RECEPTION | ☒ | ☐ | |
| C. ALTITUDES AIRCRAFT MANEUVERING ALTITUDES | ☒ | ☐ | | G. ATC COMMUNICATIONS | ☒ | ☐ | |
| D. TIME/DISTANCE TO PRE-PARE FOR FAF | ☒ | ☐ | | H. DESCENT GRADIENT | ☒ | ☐ | |

**3. FAF TO MISSED APPROACH POINT (MAP).** TERPS SPECIALIST COMMENTS/CONCERNS *(Continue on separate sheet of paper)*:

TACAN and Localizer missed approach point was moved from .8 DME to .5 DME. VDP was changed to 1.1 DME due to the installation of a new PAPI system.

| FAF TO MISSED APPROACH POINT (MAP) | SAT | UN SAT | REMARKS |
|---|---|---|---|
| A. OBSTACLE CLEARANCE | ☒ | ☐ | |
| B. FINAL APPROACH COURSE ALIGNMENT | ☒ | ☐ | |
| C. AIRCRAFT MANEUVERING | ☒ | ☐ | |
| D. VISUAL DESCENT POINT (VDP) | ☒ | ☐ | |
| E. MAP LOCATION | ☒ | ☐ | New location works fine. |
| F. COCKPIT WORKLOAD | ☒ | ☐ | |
| G. DESCENT GRADIENT | ☒ | ☐ | |
| H. NAVAID RECEPTION | ☒ | ☐ | |
| I. APPROACH LIGHTS | ☐ | ☒ | Trees/shrubs are growing up through the approach lights (see block #6) |
| J. LANDING MINIMUMS | ☒ | ☐ | |
| K. ATC COMMUNICATIONS | ☒ | ☐ | |

**AF IMT 3992, 19961201, V2**

**Figure A7.2. Sample AF IMT 3992, Instrument Procedure Flyability Check Instrument Approach Procedure (IAP) (Reverse).**

**4. MISSED APPROACH** *(NOTE: Missed approach should be flown at approximately 160 FPNM (450 Ft/MinVVI at 180 KIAS) or at missed approach climb tablle gradient, whichever is greater. Vigiliance for obstruction is critical.)* TERPS SPECIALIST COMMENTS/CONCERNS:

The procedure requires a missed approach climb gradient of 250 ft/NM due to a 1998' (MSL) antenna located appromimately 3.5 NM from the departure end of the runway (6.1 NM from missed approach point, 1.5 NM right of flight track).

| MISSED APPROACH | SAT | UN SAT | REMARKS | MISSED APPROACH | SAT | UN SAT | REMARKS |
|---|---|---|---|---|---|---|---|
| A. UNDERSTANDABLE | ☒ | ☐ | | E. COCKPIT WORKLOAD | ☒ | ☐ | |
| B. AIRCRAFT MANEUVERING | ☒ | ☐ | | F. ATC COMMUNICATIONS | ☐ | ☐ | |
| C. OBSTACLE CLEARANCE | ☒ | ☐ | | G. CLIMB GRADIENT | ☒ | ☐ | |
| D. NAVAID RECEIPTION | ☒ | ☐ | | | | | |

**5. CIRCLING AREAS.** (NOTE: If the circling maneuvering is not flown ("N/F") make comments as to the safeness of the circling area. For approaches with CAT D, minimums, look for obstacles within 3 NM of the runway in all directions. For approaches with CAT E minimums, look for obstacles within 5 NM of the runway in all directions. The location and estimated height of questionable obstacles should be noted in the remarks section of this checklist.) TERPS SPECIALIST COMMENTS/CONCERNS:

Evaluate to Cat E circling area. Make note of the 1998' (MSL) antenna approximately 3.5 NM off the departure end of runway 36R.

| CIRCLING AREAS | SAT | UN SAT | REMARKS |
|---|---|---|---|
| A. AIRCRAFT MANEUVERING | ☒ | ☐ | See comments below. |
| B. OBSTACLE CLEARANCE | ☒ | ☐ | See comments below. |
| C. ABSENCE OF OPTICAL ILLUSIONS | ☒ | ☐ | See comments below. |
| D. ATC COMMUNICATIONS | ☒ | ☐ | |

**6. ADDITIONAL COMMENTS:**

Block 3I: Trees/shrubs are growing up through the first line of approach lighting bars, obscuring the lights.

Blocks 5A, 5B and 5C: Cat E circling area was flown and evaluated. We conducted this check during daylight hours. however, the 1998' (MSL) antenna located in the Cat E circling area could be hazardous during the hours of darkness. The antenna contains the appropriate red lighting, however it may blend in with other ground lighting and could be difficult to acquire when performing the circling maneuver. I recommend that this circling area be evaluated at night or consider Cat E circling not be authorized in that quadrant.

**I CONSIDER THE ABOVE SPECIFIED INSTRUMENT PROCEDURE AS FLYABLE AND SATISFACTORY.**

| SIGNATURE | | DATE |
|---|---|---|
| John Q Smith | | 20040722 |
| PRINT/TYPE NAME AND RANK | UNIT AND MAJCOM | DUTY PHONE *(DSN/Commerical)* |
| John Q. Smith, Major, USAF | 123 AW AMC | DSN 777-6789<br>Comm (789) 777-6789 |

**AF IMT 3992, 19961201, V2 (REVERSE)**

**Figure A7.3. Sample AF IMT 3993, Instrument Procedure Flyability Check Departure Procedure (DP).**

**INSTRUMENT PROCEDURE FLYABILITY CHECK**
**DEPARTURE PROCEDURE (DP)**

| LOCATION | ICAO IDENTIFICATION |
|---|---|
| Anywhere AFB, FL | KBDA |

NAME OF PROCEDURE
Anywhere 1 Departure

| TYPE AIRCRAFT | PILOT |
|---|---|
| C-17 | Maj. John Q. Smith |

**METHOD**

| ☒ LIVE *(Actually flown)* | ☐ SIMULATOR | ☐ TABLE TOP REVIEW ONLY |
|---|---|---|

TERPS SPECIALIST COMMENTS

Evaluate the 420 ft/NM climb gradient for acceptability. This climb gradient is required to provide the appropriate obstacle clearance over a 1998' (MSL) antenna located 3.5 NM from the departure end of the runway, approximately 1/4 NM East of the proposed ground track.

***NOTE:*** *Departures are to be flown at 200 feet per Nautical Mile (i.e., 600 Ft/Min. VVI at 180 KIAS) or at the published Rate of Climb as indicated in a Climb Table, whichever is greater. Vigilance for obstructions that could be unsafe is critical. Areas not checked/flown should be annotated "NF" in the remarks section*

| SAT | UNSAT | | REMARKS |
|---|---|---|---|
| ☒ | ☐ | AIRCRAFT MANEUVERING | |
| ☒ | ☐ | ALTITUDE RESTRICTIONS | |
| ☒ | ☐ | NAVAID RECEPTION | |
| ☒ | ☐ | COCKPIT WORKLOAD | |
| ☒ | ☐ | OBSTACLE CLEARANCE | |
| ☒ | ☐ | EASY TO UNDERSTAND | |

FLYABILITY CHECK PILOT COMMENTS

The climb gradient of 420 ft/NM was found to be acceptable for our particular mission profile, however, note that this climb gradient may be unacceptable for certain aircraft operating at or near gross weight. Consideration should be given to altering the departure course to the West, if possible, to avoid the obstacle and reduce the climb gradient.

*I CONSIDER THE ABOVE SPECIFIED INSTRUMENT PROCEDURE AS FLYABLE IAW THIS CHECKLIST*

| SIGNATURE | | DATE |
|---|---|---|
| | | 20040722 |
| PRINTED/TYPED NAME AND RANK | DUTY PHONE *(DSN/COMMERCIAL)* | UNIT/MAJCOM |
| John Q. Smith, Major, USAF | DSN 777-6789<br>Comm (789) 777-6789 | 123 AW AMC |

**AF IMT 3993, 19961201, V3**

## Attachment 8

## SAMPLE

## STANDARD TERMINAL AMENDMENT SYSTEM (TAS) LETTER

MEMORANDUM FOR NGA/Terminals Branch 29 July 2013

FROM: MAJCOM TERPS Function
Street Address
Base, State, Zip Code

SUBJECT: ACC 08-366, TACAN RWY 12, Mountain Home AFB (KMUO), Amdt 1

1. This is Amendment 2 (or the next amendment number in sequence) to subject procedure (or inform NGA that this is a new original and to add "Orig" to the margin information). Aeronautical data provided in the attached documentation was used to develop and flight inspect this instrument procedure. When changes to the attached aeronautical data are required, the changes must be coordinated with and approved by the MAJCOM TERPS function responsible for the IFP *prior to the publication date*. **Note:** This is the mandatory opening paragraph and it shall contain at least the above information.

2. PLANVIEW.
   a. Change the final approach course from 124° to 123°.
   b. Change MOU R-304 to MOU R-303.
   c. Change the IAF MSTNG holding pattern as follows;
      (1) Outbound leg heading from 224° to 220°.
      (2) Inbound leg heading from 044° to 040°.
      (3) Holding radial from MOU R-224 to MOU R-220.
   d. Change the IAF MSTNG coordinates to N42°55.44' W116°05.18'.

3. PROFILE.
   a. Change the final approach course from 124° to 123°.
   b. Change MSTNG R-224 to MSTNG R-220.
   c. Change OTLAW R-304 to OTLAW R-303.

4. MINIMA DATA. No changes required (**Note:** When appropriate, enter "No changes required" after the paragraph topic in paragraphs 2, 3, or 4 or do not include the paragraph topic in the TAS letter; i.e., don't add the paragraph topic to the TAS letter without entering any information).

5. RADAR INSTRUMENT APPROACH MINIMUMS. Include specific changes for this item, as appropriate.

6. IFR TAKE-OFF MINIMUMS AND DEPARTURE PROCEDURES. Include specific changes for this item, as appropriate, on departure procedures.

7. DEPARTURE ROUTE DESCRIPTION. Include specific changes for this item, as appropriate, on departure procedures.

8. MISCELLANEOUS. When deemed necessary by the TERPS OPR, add any non-procedural items (pilot briefing strip, airport sketch, AIRPORT DIAGRAM, etc.) requiring changes/attention as a reminder to NGA. Also include the statement "See attached FAA Form 8260-2 for (insert fix name)", when sending original or amended fix or waypoint documentation.

a. Pilot Briefing Strip; change final approach course from 124° to 123°.
b. Airport Sketch; change final approach course from 124° to 123°.
c. See attached FAA Form 8260-2 for MSTNG.
d. See attached FAA Form 8260-2 for OTLAW.
e. Add the AIRPORT DIAGRAM for this location (**Note:** NGA will not publish the AIRPORT DIAGRAM unless this request is made).

9. Effective Date. Enter the date required for publication of a new instrument procedure or the publication of any change(s) to an existing instrument procedure.

10. Any other MAJCOM specified information may be added such as NOTAM information.

11. POC information. Include name, phone number and email address. **Note:** This is the mandatory closing paragraph and it shall contain at least the above information.

JOHN Q. DOE, TSgt, USAF
Title
Office

## Attachment 9

## SAMPLE POST PUBLICATION REVIEW (PPR) LETTER

MEMORANDUM FOR NGA/Terminals Branch 1 Sept 2013

FROM: MAJCOM TERPS Function
Street Address
Base, State, Zip Code

SUBJECT: PPR for ACC 08-366, TACAN RWY 12, Amendment 2, Mountain Home AFB (KMUO) (**Note:** Do not assign a new TAS letter number; add "PPR for" to the beginning of the subject line of the original TAS letter. Update the amendment number to the currently published amendment number in the subject line.)

1. Post publication review of the ACC 08-366 TAS letter revealed the following items that were not corrected in Amendment 2 to subject procedure. **Note:** This is the mandatory opening paragraph and it shall contain at least the above information.

2. PLANVIEW.
   a. Change MOU R-304 to MOU R-303.
   b. Change the IAF MSTNG coordinates to N42°55.44' W116°05.18'.

3. PROFILE. Change OTLAW R-304 to OTLAW R-303.

4. **Note:** Do not add any new items for NGA to correct or change in the PPR letter; new items not in the original TAS letter require a new TAS letter with a new TAS letter number.

5. POC information. Include name, phone number and email address. **Note:** This is the mandatory closing paragraph and it shall contain at least the above information.

JOHN Q. DOE, TSgt, USAF
Title
Office

## Attachment 10

## SAMPLE STANDARD TERMINAL AMENDMENT SYSTEM (TAS) LETTER – FTIP

MEMORANDUM FOR NGA/Terminals Branch 15 Sep 2013

FROM: MAJCOM TERPS Function
Street Address (or Box number, as necessary)
Base, State, Zip Code (or APO number, as necessary)

SUBJECT: ETAS 943/08, TACAN RWY 06, Amendment 5, GRAZZANISE, IT (LIRM)

1. This is Amendment 6 (or the next amendment number in sequence) to subject procedure (or inform NGA that this is a new original and to add "Orig" to the margin information). Aeronautical data provided in the attached documentation was used to develop and flight inspect this instrument procedure. When changes to the attached aeronautical data are required, the changes must be coordinated with and approved by the MAJCOM TERPS function responsible for the IFP *prior to the publication date*. **Note:** This is the mandatory opening paragraph and it shall contain at least the above information. FTIP PPR letter format shall be IAW Attachment 9.

2. PLANVIEW.
   a. Change the final approach course from 063° to 062°.
   b. Change GRA R-243 to GRA R-242.
   c. Change the holding pattern as follows;
      (1) Outbound leg heading from 243° to 242°.
      (2) Inbound leg heading from 063° to 062°.

3. PROFILE.
   a. Change the final approach course from 063° to 062°.
   b. Change holding pattern heading 243° to 242°.
   c. Change holding pattern heading 063° to 062°.

4. MINIMA DATA.
   a. Change S-06 CAT AB minima to: 500-1000m 482 (500-1000m)
   b. Change S-06 CAT CD minima to: 500-1200m 482 (500-1200m)
   c. Change S-06 CAT E minima to: 500-1600m 482 (500-1600m)

(**Note:** When appropriate, enter "No changes required" after the paragraph topic in paragraphs 2, 3, or 4 or do not include the paragraph topic in the TAS letter; i.e., don't add the paragraph topic to the TAS letter without entering any information.)

5. RADAR INSTRUMENT APPROACH MINIMUMS. Include specific changes for this item, as appropriate.

6. IFR TAKE-OFF MINIMUMS AND DEPARTURE PROCEDURES. Include specific changes for this item, as appropriate, on departure procedures.

7. DEPARTURE ROUTE DESCRIPTION. Include specific changes for this item, as appropriate, on departure procedures.

8. MISCELLANEOUS. When deemed necessary by the TERPS OPR, add any non-procedural items (pilot briefing strip, airport sketch, AIRPORT DIAGRAM, etc.) requiring changes/attention as a reminder to NGA.

a. Pilot Briefing Strip; change final approach course from 063° to 062°.
b. Airport sketch; change final approach course from 063° to 062°.
c. Add the AIRPORT DIAGRAM for this location. **Note:** NGA will not publish the AIRPORT DIAGRAM unless this request is made.

9. SOURCE. Source refers to the host nation document used as reference to publish or amend an instrument procedure. Ensure a complete description of the exact source (country AIP/FLIP, page number, and date) is documented here. Examples: "Belgium MIL AIP, page A.002, 19 Feb 03" or "AIP PAKISTAN Supplement, AD2.OPLA-25, 26 Aug 02." "HN plate dated 27 Nov 2003" or "AIP Korea" is not enough information when coordinating with NGA.

10. Effective Date. Enter the date required for publication of a new instrument procedure or the publication of any change(s) to an existing instrument procedure.

11. Any other MAJCOM specified information may be added such as NOTAM information.

12. POC information. Include name, phone number and email address. **Note:** This is the mandatory closing paragraph and it shall contain at least the above information.

JOHN Q. DOE, TSgt, USAF
Title
Office

## Attachment 11 (Added-AFSPC)

## OE/AAA EVALUATION WITH NO OBJECTION FOR AFSPC TERPS

### Figure A11.1. AOE/AAA Evaluation with No Objection for AFSPC TERPS

**DEPARTMENT OF THE AIR FORCE**
**HEADQUARTERS AIR FORCE SPACE COMMAND**

22 October 2013

MEMORANDUM FOR AIR FORCE REPRESENTATIVE
Eastern Service Area Transportation Specialist
(Terri Johnson)

FROM: HQ AFSPC/A3SR TERPS (TSgt Elizabeth Stackhouse)

SUBJECT: OE Case Evaluation

1. After evaluating the following OE Case study, AFSPC TERPS has no objections to its development.

2013-ASO-9048-OE

2. Please forward any questions to me at DSN 692-6071, commercial 719-554-6071 or via email at AFSPC.A3RA.TERPS@US.AF.MIL.

/// signed ess 22 Oct 13///
ELIZABETH STACKHOUSE, TSGT, USAF
HQ AFSPC TERPS

GUARDIANS OF THE HIGH FRONTIER

## Attachment 12 (Added-AFSPC)

## OE/AAA EVALUATION WITH NO OBJECTION WITH PROVISIONS FOR AFSPC TERPS

**Figure A12.1. OE/AAA Evaluation with No Objection with Provisions for AFSPC TERPS**

**DEPARTMENT OF THE AIR FORCE**
**HEADQUARTERS AIR FORCE SPACE COMMAND**

25 August 2013

MEMORANDUM FOR AIR FORCE REPRESENTATIVE
Eastern Service Area Transportation Specialist
(Terri Johnson)

FROM: HQ AFSPC/A3SR TERPS (TSgt Elizabeth Stackhouse)

SUBJECT: OE Case Evaluation

1. After evaluating the following OE Case study, AFSPC has no objections to its development; however, there will be TERPS impacts if this project is approved.

**2013-AWP-5233-OE**

2. (NARRATIVE).

3. Please forward any questions to me at DSN 692-6071, commercial 719-554-6071 or via email at AFSPC.A3RA.TERPS@US.AF.MIL.

/// signed ess 25 Aug 13///
ELIZABETH STACKHOUSE, TSGT, USAF
HQ AFSPC TERPS

**GUARDIANS OF THE HIGH FRONTIER**

## Attachment 13 (Added-AFSPC)

## OE/AAA EVALUATION WITH SIGNIFICANT ADVERSE IMPACT FOR AFSPC TERPS

**Figure A13.1. OE/AAA Evaluation with Significant Adverse Impact for AFSPC TERPS**

**DEPARTMENT OF THE AIR FORCE**
**HEADQUARTERS AIR FORCE SPACE COMMAND**

25 July 2013

MEMORANDUM FOR AIR FORCE REPRESENTATIVE
Eastern Service Area Transportation Specialist
(Terri Johnson)

FROM: HQ AFSPC TERPS (TSgt Elizabeth Stackhouse)

SUBJECT: OE Case Evaluation

1. After evaluating the following OE Case study, AFSPC has significant objections to its development.

2013-AWP-4190-OE

2. If this project were to be developed, decision altitude for the ILS approach would be raised by 250 feet for both the ILS RWY 12 and HI ILS RWY 12 approached at Vandenberg AFB, California. This eliminates precision approach capability to the primary runway at this airport.

Additionally, diverse departures for runway 30 would be required to execute a 420 foot per nautical mile climb gradient, eliminating the IFR departure capability for runway 30.

3. Please forward any questions to me at DSN 692-6071, commercial 719-554-6071 or via email at AFSPC.A3RA.TERPS@US.AF.MIL.

/// signed ess 25 Jul 13///
ELIZABETH STACKHOUSE, TSGT, USAF
HQ AFSPC TERPS

**GUARDIANS OF THE HIGH FRONTIER**