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INSTRUMENT PROCEDURES

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This instruction implements AFPD 11-2, *Flight Rules and Procedures*. It provides guidance on establishing, approving, revising, or deleting instrument procedures. It will apply to flying activities at all airfields where the Air Force, or an Air Force component of a unified command conducts or supports instrument flight. Use this instruction in conjunction with AFMAN 11-226 (I), *US Standard for Terminal Instrument Procedures (TERPS)* and NATO APATC-1, *Criteria for the Preparation of Instrument Approach and Departure Procedures*.

Forward copies of all supplements for this instruction to the Air Force Flight Standards Agency, Director of Operations, Instrument Procedures (AFFSA/XOIP) for approval. For suggested changes to this instruction, use AF IMT 847, ***Recommendation for Change of Publication***. Send AF IMT 847 through channels to AFFSA/XOIP. AFI 11-215, *Flight Manual Procedures,* will govern processing of AF IMTs 847. Maintain and dispose of records created as a result of prescribed processes in accordance with AFMAN 37-139, *Records Disposition Schedule.*

SUMMARY OF REVISIONS

This revision incorporates interim change (IC) 2004-1 (**Attachment 10**). This revision includes changes contained in Change 19 to AFI 11-226(I) (throughout); implements use of USAF Global Procedure Designer (throughout); changes AF Form to AF IMT (throughout); updates office names and symbols (throughout); updates URLs for the USAF, Federal Aviation Administration, and National Geospatial-Intelligence Agency (throughout); updates the OPR and certified by lines (title page); details other governing directives for the USAF instrument procedure program (throughout); outlines the roles and responsibilities of HQ USAF (paragraph **1.1.**); outlines the roles and responsibilities of AFFSA/XOIP (paragraph **1.2.**); outlines the roles and responsibilities of MAJCOM TERPS functions (paragraph **1.3.**); outlines the roles and responsibilities of the MAJCOM or Air Force Component of a Unified Command, Director of Operations (paragraph **1.4.**); outlines the roles and responsibilities of the unit TERPS function (paragraph **1.5.**); updates procedures for developing, evaluating, and/or documenting holding patterns (paragraph **2.1.**), updates procedures for ensuring instrument procedures are separated from Special Use

Airspace (paragraph **2.2.**), updates procedures for documenting navigational fixes (paragraph **2.3.**); updates procedures for developing, evaluating, and/or documenting NAVAID service volume (paragraph **2.4.**), updates guidance regarding airspace requirements and the environmental impact analysis process (paragraph **2.5.**); updates guidance for processing changes to magnetic variation (paragraph **2.6.**); updates VMC procedures to VFR procedures (paragraph **2.7.**); updates procedures for obtaining and processing FAA forms and publications and for evaluating new construction and alterations to current obstructions (paragraph **2.8.**), updates the wording regarding procedures requiring Special Aircrew Training (paragraph **2.9.**); updates departure and missed approach climb gradient application for CONUS and OCONUS locations (paragraph **2.10.**); updates departure procedure definitions (paragraph **3.1.**); adds a figure to illustrate the initial climb area construction (**Figure 3.1.**); deletes general guidelines for determining obstacle driven departure procedures (**Table 3.1.**); updates guidance for developing RNAV departures (paragraph **3.2.**); updates guidance on application of departure procedure criteria (paragraph **3.3.**); modifies guidance for completing AF IMT 3634 (paragraph **3.4.**); deletes guidance for use of AF IMT 3635 (paragraph **3.5.**) and AF IMT 3636 (paragraph **3.6.**); updates guidance for standard terminal arrivals (paragraph **4.1.**), updates guidance for airborne radar approaches (paragraph **4.2.**), updates guidance for area navigation (paragraph **4.3.**); adds special use and VFR requirements to point in space procedures (paragraph **4.4.**); updates guidance for publishing ILS restrictions (paragraph **4.5.**); updates guidance for combining instrument procedures (paragraph **4.6.**); updates guidance on displaced threshold procedures (paragraph **4.7.**); updates guidance on side-step maneuver procedures (paragraph **4.8.**); adds sample side-step minima publication example (**Figure 4.1.**); updates guidance on airport surveillance radar approach procedures (paragraph **4.9.**); updates sample recommended altitude calculations (**Table 4.1.**); deletes guidance for ASR approaches that use PAR equipment at RFC only facilities (paragraph **4.10.**); updates guidance for best fit straight line application to threshold crossing height (paragraph **4.11.**); updates guidance for completing AF IMT 3637 (paragraph **4.12.**), updates guidance for documenting precision computations (paragraph **4.13.**); updates guidance for completing AF IMT 3640 (paragraph **4.14.**), AF IMT 3641 (paragraph **4.15.**), and AF IMT 3642 (paragraph **4.16.**); deletes guidance for AF Form 3981, GPS/RNAV Descent Angle and Surface Evaluations (paragraph **4.17.**); updates guidance for AF IMT 3982 (paragraph **4.18.**); updates procedures for requesting, processing, and publishing instrument procedures (paragraph **5.1.**); updates MAJCOM responsibilities (paragraph **5.2.**); updates workflow when processing standard instrument procedures (**Figure 5.1.**); updates workflow when processing nonstandard instrument procedures (**Figure 5.2.**); updates instrument procedure package content requirements (**Table 5.1.**); updates unit responsibilities (paragraph **5.3.**); updates MAJCOM Headquarters Director of Operations responsibilities (paragraph **5.4.**); updates waiver processing procedures (paragraph **5.5.**); updates guidance for completing AF IMT 3980 (paragraph **5.6.**); updates guidance for deleting instrument procedures (paragraph **5.7.**); updates guidance for processing special use instrument procedures (paragraph **5.8.**); updates guidance for maintenance of flight information publications (paragraph **6.1.**); updates guidance for revising instrument procedures (paragraph **6.2.**); updates guidance for review of flight information publications and other TERPS related data (paragraph **6.3.**); updates and expands guidance for publishing foreign terminal instrument procedures (paragraph **7.1.**); updates map scale requirements (**Table 7.1.**); updates the FTIP publication process (**Figure 7.1.**); updates procedures for aircrew use of foreign instrument procedures (paragraph **7.2.**); updates the process for reviewing FTIP (**Figure 7.2.**); updates flyability check and flight inspection requirements for foreign instrument procedures (paragraph **7.3.**); updates guidance for foreign procedure turns (paragraph **7.4.**); updates guidance on metric minima (paragraph **7.5.**); updates NOTAM guidance (paragraph **7.6.**); deletes guidance for applying APATC-1 (paragraph **7.7.**); updates flyability check guidance (paragraph **8.1.**); updates flight inspection guidance (paragraph **8.2.**); updates the controlling obstacle template example (**Figure 8.1.**); updates guidance for

flight inspection of special use instrument procedures (paragraph **8.3.**); updates instructions for AF IMT 3992 (paragraph **8.4.**) and AF IMT 3993 (paragraph **8.5.**); updates guidance for developing minimum vectoring altitude charts (paragraph **9.1.**); replaces **Figure 9.1.**, *Minimum Vectoring Altitude Chart (MVAC) for Terminal, Single-Sensor Operations*, with *Correct Application of Prominent Obstacle Sector* (**Figure 9.1.**); replaces **Figure 9.2.**, *MVAC Sector Buffer Areas*, with *Incorrect Application of Prominent Obstacle Sector* (**Figure 9.2.**); replaces **Figure 9.3.**, *Minimum Vectoring Altitude Chart (MVAC) for Mosaic Multi-Sensor Radar Systems*, with *User Defined Note Annotating Mountainous Terrain Designation* (**Figure 9.3.**); replaces **Figure 9.4.**, *Mosaic Buffer Areas*, with *Digital VFR Sectional Spatial Reference Information* (**Figure 9.4.**); replaces **Figure 9.5.**, *Minimum Instrument Flight Rules Altitude Chart (MIFRAC)*, with *GPD Display Parameters Dialogue* (**Figure 9.5.**); replaces **Figure 9.6.**, *MIFRAC Sector Buffer Areas*, with *MVAC Sectors in GPD Chart Designer with VFR Sectional and ATC Delegated Airspace* (**Figure 9.6.**); adds illustration of Minimum Vectoring Altitude Chart Standard/Irregular/Polygonal/ Prominent Obstacle Sectors (**Figure 9.7.**); adds illustration of Minimum Vectoring Altitude Chart with Polygonal Sectors (**Figure 9.8.**); updates guidance for developing minimum instrument flight rules altitude charts (paragraph **9.2.**); adds illustration of NAVAID restrictions (**Figure 9.9.**); adds illustration of MIFRAC Sectors in GPD Chart Designer with VFR Sectional (**Figure 9.10.**); adds illustration of MIFRAC Sectors in GPD Chart Designer with MVAC (**Figure 9.11.**); updates guidance for chart documentation and processing (paragraph **9.3.**); deletes guidance for use of AF Form 3633 (paragraph **9.4.**); updates guidance for Category I MLS procedures (paragraph **10.1.**); updates guidance for mobile MLS procedures (paragraph **10.2.**); updates operational limits of the MMLS (**Figure 10.1.**); deletes guidance for AF Form 3979 (paragraph **10.3.**); deletes TCH upper limits table (**Table 10.1.**); deletes glideslope angles and associated descent gradients table (**Table 10.2.**); deletes military standard MMLS precision landing minimums table (**Table 10.3.**); outlines guidance for TERPS automation software (paragraph **11.1.**); establishes USAF GPD hardware requirements (paragraph **11.2.**); details recommended USAF GPD hardware requirements (**Table 11.1.**); outlines procedures for the establishment of initial USAF GPD capability (paragraph **11.3.**); adds minimum USAF GPD hardware requirements (**Table 11.2.**); adds USAF GPD laptop requirements (**Table 11.3.**); outlines USAF GPD initial adaptation workflow (**Table 11.4.**); introduces horizontal and vertical accuracies as determined by map source (**Table 11.5.**); replaces paragraph **11.4.**, *AF FORM 3628, TERPS Automation Data Summary*, with *Additional GPD Considerations/Miscellaneous* (paragraph **11.4.**); replaces **Figure 11.1.**, *Displaced Threshold Examples, RWY 09*, with *Runway Physical/Landing/Takeoff /Displacement Lengths* (**Figure 11.1.**); replaces **Figure 11.2.**, *Obstacle Identification Area (OIA) -- Obstacles Within 10 NM of ARP*, with *Runway Physical/Landing/ Takeoff/Displacement Lengths in GPD* (**Figure 11.2.**); replaces **Figure 11.3.**, *OIA - 10 NM to 30 NM Area*, with *Omni-directional NAVAID Radio Class* (**Figure 11.3.**); replaces **Figure 11.4.**, *OIA - 30 NM to 60 NM Area*, with *Airport NAVAIDs (example ILS)* (**Figure 11.4.**); replaces **Figure 11.5.**, *OIA - 60 NM to 100 NM Area*, with *Fix Data for 'LEMAY' from FAA Order 7350.7, Location Identifiers* (**Figure 11.5.**); replaces **Figure 11.6.**, *Chart Scales and Equivalents*, with *Fix/Waypoint Supplemental Data for 'LEMAY' in Data Manager* (**Figure 11.6.**); adds illustration on adjustment of obstacle height based on vertical accuracy (**Figure 11.7.**); adds illustration depicting adjustment of obstacle location based on horizontal accuracy (**Figure 11.8.**); adds illustration depicting GPD terrain analysis incomplete warning (**Figure 11.9.**); adds illustration depicting area with missing terrain data (**Figure 11.10.**); adds illustration depicting how to determine the contour elevation using VMAP (**Figure 11.11.**); deletes guidance for completing AF Form 3629, Obstruction Data (paragraph **11.5.**); updates guidance for use of hand-held GPS receivers (paragraph **11.6.**); deletes general obstacle charting and map information (paragraph **11.7.**); deletes guidance for handling Digital Terrain Elevation Data (paragraph **11.8.**); deletes guidance for handling Digital Vertical Obstruction File data (paragraph **11.9.**); deletes guidance for handling Chart Updating Manual/Elec-

tronic Chart Updating Manual information (paragraph **11.10.**); deletes guidance on construction or alteration of obstruction evaluations (paragraph **11.11.**); deletes guidance for FAA Form 8240-22 (paragraph 11.12); replaces paragraph **12.1.**, *TERPS Training*, with *Training Responsibilities* (paragraph **12.1.**); replaces paragraph **12.2.**, *Forms Prescribed*, with *Prescribed Training* (paragraph **12.2.**); updates the Glossary of References and Supporting Information with new terms, abbreviations, acronyms, and references (**Attachment 1**); replaces paragraph **A3.1.**, *AFMAN 11-226(I), Volume 1, paragraph 5b, Circling*, with *AFMAN 11-226(I), Volume 1* (paragraph **A3.1.**); adds illustration on determining straight-in MAP-to-threshold distance (**Figure A3.2.**); adds illustration on determining circling MAP-to-threshold distance (**Figure A3.3.**); adds illustration on determining the effect of facility distance on circling visibility minimums (**Figure A3.4.**); replaces paragraph **A3.2.**, *AFMAN 11-226(I), Volume 1, paragraph 122a, Airport*, with *AFMAN 11-226(I), Volume 3* (paragraph **A3.2.**); adds illustration depicting the portion of clear zone affecting CAT I minimums (**Figure A3.5.**); replaces paragraph **A3.3.**, *AFMAN 11-226(I), Volume 1, paragraph 141, Nonstandard Procedures*, with *Category II/III ILS Precision Minimums Requirements* (paragraph **A3.3.**); adds illustration depicting lowest CAT II minimums (**Table A3.1.**); adds illustration depicting how to calculate radio altimeter height (**Figure A3.6.**); adds illustration depicting the Section 1A touchdown area (**Figure A3.7.**); adds illustration depicting Section 1B (**Figure A3.8.**); adds illustration depicting Section 1C (**Figure A3.9.**); adds illustration depicting section 2, non-RNAV (**Figure A3.10.**); adds two illustration depicting the turning missed approach (**Figure A3.11.**) and (Figure A3.12); deletes guidance in paragraphs **A3.4.** through **A3.35.**; adds reference to **Figure A4.4.** in paragraph **A4.1.**, GPI, RPI, TCH Computations (paragraph **A4.1.**); corrects **Figure A4.4.**, *PAR RPI Distance from Runway Threshold* (**Figure A4.4.**); updates paragraph **A4.6.**, *True/Magnetic Azimuth Conversions* (paragraph **A4.6.**); updates **Table A4.1.**; updates **Table A4.2.**; updates paragraph **A4.10.**, *Calculating Missed Approach Climb Gradients* (paragraph **A4.10.**); replaces **Attachment 5**, *Checklist for Review of Host Nation AIPs (Accredited Nations)*, with *Checklist for Review of Host Nation Instrument Procedure Programs and Airports* (**Attachment 5**); deletes **Attachment 6**, *Checklist for Special Accreditation of Host Nations/Airports* (**Attachment 6**); replaces **Attachment 7**, *Checklist for Review of Foreign Terminal Instrument Procedures*, with *Checklist for Review and/or Publication of Foreign Terminal Instrument Procedures* (**Attachment 7**); updates **Attachment 8**, *Instrument Procedure Flyability Check Instructions* (**Attachment 8**); replaces **Attachment 9**, *Horizontal Datum Codes*, with *Use of International Criteria* (**Attachment 9**). IC 2004-1 is the last attachment of this publication. A "|" indicates revised material since the last edition.

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Chapter 1

RESPONSIBILITIES

1.1. HQ USAF Responsibilities. HQ USAF/XOO has delegated the authority for approving criteria in AFMAN 11-226(I), *United States Standard for Terminal Instrument Procedures (TERPS),* NATO AATCP-1(B), ICAO PANS-OPS, and this instruction to AFFSA/XOIP.

1.2. AFFSA/XOIP Responsibilities.

1.2.1. Reviews nonstandard instrument procedures and completes waiver documentation for AFFSA/CC approval.

1.2.2. Approves standard instrument procedures. AFFSA/CC delegates this authority to the major command (MAJCOM) TERPS functions.

1.2.3. Maintains liaison, affects 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.

1.2.4. Develops instrument procedure criteria and sets policy in support of the USAF TERPS Program as a result of ongoing operational needs and/or as requested by HQ USAF or MAJCOMs; tests and evaluates criteria at the direction of HQ USAF.

1.2.5. Validates and approves foreign nation's instrument procedure development and publication practices under the guidelines established in the USAF Foreign Terminal Instrument Procedures (FTIP) Acceptance Program (see **Chapter 7** for limitations).

1.2.6. Informs the National Geospatial-Intelligence Agency (NGA) which USAF TERPS functions may publish, delete, or revise instrument procedures, including FTIP.

1.2.7. Develops and maintains agreements with NGA outlining the data required for publication and maintenance of instrument procedures, including FTIP.

1.2.8. Develops and maintains agreements with the Federal Aviation Administration (FAA) Flight Standards office outlining the requirements for processing USAF instrument procedures at US civil airports IAW FAA Order 8260.32.

1.2.9. Maintains a listing of instrument procedures by location, type of procedure, and requiring commands.

1.2.10. Determines requirements and provides clarification/interpretation relating to application of criteria as it relates to Global Procedure Designer (GPD) software. Maintains liaison with AFFSA/XR and the Software Program Office (ESC) to prioritize criteria implementation and change control. Establishes and maintains the AFFSA GPD help desk.

1.2.11. Provides direction and information pertinent to instrument procedures and aeronautical information publications on an as-needed basis.

1.2.12. Defines curriculum items used for the development of the E3AZR1C171-000 and E3OZR13M4-000 TERPS Course Training Standard (CTS). These curriculum items and TERPS training requirements are communicated to AFFSA/XA for implementation.

1.2.13. Reviews and approves MAJCOM supplements to this instruction.

1.2.14. Develops and maintains the TERPS Checklist in AFI 13-218, *Air Traffic System Evaluation Program*.

1.2.15. Develops and maintains AFMAN 13-215, *ATC RADAR Maps and Associated Systems*.

1.3. MAJCOM TERPS Responsibilities.

1.3.1. Develop, review, approve, and submit for publication/implementation instrument procedures for locations within their TERPS Area of Responsibility (AOR) to include supported unit's Minimum Vectoring Altitude Chart (MVAC), Minimum IFR Altitude Chart (MIFRAC), and Diverse Vector Area (DVA).

1.3.1.1. The MAJCOM responsible for the TERPS AOR may delegate final TERPS review and approval authority for standard instrument procedures to group and wing level, combat communications units, and TERPS Unit Type Code (UTC) packages when these units are deployed within their AOR to support unique theater requirements for short-notice operations.

1.3.1.1.1. When considering delegation of this authority, the granting MAJCOM shall coordinate with the unit's parent MAJCOM, when other than the granting MAJCOM, for comments.

1.3.1.1.2. The granting MAJCOM shall inform AFFSA/XOI, and, if applicable, the parent MAJCOM, when this authority is delegated.

1.3.1.1.3. When this authority is delegated, deployed units shall forward a copy of the procedure package to the MAJCOM TERPS function responsible for the location.

1.3.1.1.4. Deployed organizations supporting long-term exercises/operations will not normally be delegated this authority and will process instrument procedures through the MAJCOM TERPS function responsible for the location according to **Chapter 5** of this instruction.

1.3.1.1.5. All nonstandard procedures developed by the deployed unit will be processed through the MAJCOM TERPS function responsible for the location IAW paragraph **5.5.**.

1.3.2. Coordinate with another MAJCOM or AFFSA/XOIP for review and signature when situations occur that preclude a MAJCOM TERPS review by other than the procedure designer, and no other qualified person is available to complete the MAJCOM review.

NOTE: The MAJCOM TERPS function shall determine who is and/or is not qualified to complete the MAJCOM review. When performing the review, the reviewing agency shall consider the applicable MAJCOM supplement to this instruction.

1.3.3. Provide technical and procedural development assistance when requested by supported units.

1.3.4. Validate the accuracy, adequacy, safety, and practicality of each instrument procedure within their jurisdiction. While validating these items, consider:

1.3.4.1. Past, current, and intended usage by type of aircraft.

1.3.4.2. Climate and topography affecting the terminal area.

1.3.4.3. Whether the procedure is a special, restricted, or public use procedure.

1.3.4.4. Flight inspection of the procedure by a US agency or host country that adheres to US or ICAO Annex 10 flight inspection standards.

1.3.4.5. Validation of the procedure by a US agency for other US users.

1.3.4.6. The nature of deviations that make the procedure nonstandard.

1.3.5. Investigate and ensure remedial action is taken with respect to any procedure deficiency or reported hazard, including restrictions or emergency revisions to procedures within their jurisdiction.

1.3.6. Ensure a FLIP maintenance system (checklist, operating instructions, etc.) has been established that tracks procedural changes, AIP changes (host nation locations), NOTAMs, CHUM data, and related correspondence used for updating instrument procedures.

1.3.7. Implement processes for review of Foreign Terminal Instrument Procedures (FTIP) IAW **Chapter 7** of this AFI, as applicable. Review instrument procedures that are not published in the DoD or NACO FLIP prior to the procedure(s) being used unless the review has been waived (see paragraph **7.2.7.**).

1.3.8. Maintain a copy of each approved procedure package to include all supporting documentation IAW paragraph **5.3.**.

1.3.9. Maintain a current listing of all published instrument procedures (military and civil) that are published in the DoD or NACO FLIP, special use instrument procedures published in loose-leaf format, and all associated waivers using the AFFSA spreadsheet format. Each MAJCOM TERPS function shall provide a complete and current listing to AFFSA/XOIP by 15 October annually.

1.3.9.1. In addition to instrument procedures developed by the USAF, include instrument procedures developed at the request of the USAF by the FAA at domestic civil airports IAW guidance outlined in FAA Order 8260.32.

1.3.9.2. MAJCOMs shall initiate action to have instrument procedures that do not appear on this listing removed from FLIP.

1.3.9.3. Establish and maintain a current set of aeronautical source data sufficient to meet MAJCOM TERPS review and approval responsibilities. At a minimum, create a GPD globalspace containing the most current DAFIF and DVOF, and all available DTED/SRTM covering the area(s) encompassing subordinate/supported unit's workspaces. Develop workspaces that duplicate those maintained by subordinate/supported units. Initiate GPD Automated Evaluation (Auto Eval) on each workspace and all active archived procedures/charts after ingest of new aeronautical data (DTED/DVOF/DAFIF).

NOTE: Develop and maintain workspaces to support FTIP review IAW **Chapter 7** of this instruction.

1.3.9.3.1. Digital products required to support MAJCOM review and approval include DAFIF, DVOF, DTED (Level 1 and 2, and SRTM data, when available), and NACO digital VFR sectionals. Raster map/imagery products (CADRG and CIB), and vector products (UVMAP and VMAP 0 – 1) as deemed necessary.

1.3.9.3.2. Establish a formal process to ensure all manual edits to aeronautical/obstacle data made by subordinate TERPS functions are submitted to the MAJCOM for review/approval and integration into the GPD globalspace. Additionally, this process must ensure that all manual edits are submitted to the AFFSA GPD help desk for NGA action. Document this process in the appropriate MAJCOM supplement.

1.3.10. Provide AFFSA/XOIP a copy of the MAJCOM supplement to this instruction for review and approval.

1.3.11. Submit suspected problems and/or recommendations for GPD software enhancements to the AFFSA GPD help desk.

1.3.12. Perform site visits where the MAJCOM has assumed the supported unit's TERPS function.

NOTE: MAJCOMs that have assumed their supported unit TERPS function shall meet all unit TERPS function responsibilities as outlined in paragraph **1.5.**

1.3.13. Perform host nation accreditation, as applicable, IAW **Chapter 7** of this instruction.

1.3.14. Comply with requirements IAW FAA Order 8260.32, as applicable. Exceptions to requirements outlined in FAA Order 8260.32 shall be documented in a MOA between the FAA and the applicable MAJCOM.

1.3.15. MAJCOM TERPS Areas of Responsibility.

1.3.15.1. Pacific Air Forces (PACAF) is responsible for instrument procedure requirements in the geographical area covered by the Alaska FLIP; the Pacific, Australasian, and Antarctica (PAA) FLIP (except as noted in paragraph **1.3.15.5.**); and the Eastern Europe and Asia (EEA) FLIP (East of E 88° longitude). The PACAF TERPS AOR also includes India, Pakistan, Nepal and Afghanistan.

1.3.15.2. United States Air Forces Europe (USAFE) is responsible for instrument procedure requirements in the geographical area covered by the Europe, North Africa, and Middle East (ENAME) FLIP, and the Eastern Europe and Asia (EEA) FLIP (West of E 88° longitude).

1.3.15.3. Air Education and Training Command (AETC) is responsible for locations under their operational control and for instrument procedure requirements in the geographical area covered by the Canada and North Atlantic (C & NA) FLIP.

1.3.15.4. Air National Guard (ANG), Air Force Reserve Command (AFRC), Air Combat Command (ACC), Air Mobility Command (AMC), 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.

1.3.15.5. Air Mobility Command (AMC) is responsible for instrument procedure requirements in Antarctica IAW established Memorandum of Understandings with the National Science Foundation for Operational and Logistics Support of the Polar Programs, AFFSA, and other participating MAJCOMs.

NOTE: HQ AMC has delegated AMC AOS/OL-J the MAJCOM TERPS authority and responsibility for instrument procedure requirements in the geographical area covered by the Caribbean, Central, and South American (CC & SA) FLIP.

1.3.15.6. Exceptions to the areas of responsibility outlined above shall be documented in the applicable MAJCOM supplement to this instruction.

1.4. MAJCOM or Air Force Component of a Unified Command, Director of Operations/JFACC/CFACC Responsibilities.

1.4.1. Ensures operational expertise is available to assist the unit level TERPS function in developing, reviewing/validating, and revising instrument procedures.

1.4.1.1. During contingency operations, the air component commander may request the establishment of an in-theater TERPS cell for the purpose of developing and/or approving instrument procedures.

1.4.1.2. Additionally, during contingency operations, the Combined Force Air Component Commander (CFACC)/Joint Force Air Component Commander (JFACC) may elect to establish an in-theater TERPS liaison element (TLE) within the ATC Cell to coordinate a unified, theater-wide, TERPS effort.

1.4.1.2.1. The TLE should be staffed with MAJCOM TERPS specialists from one or more of the applicable MAJCOM TERPS functions to facilitate the contingency TERPS effort.

1.4.1.2.2. Paragraph **5.1.7.** provides guidance on processing instrument procedures during contingency operations.

1.4.2. Ensures a flyability check is performed for procedures to be published in the DoD FLIP.

1.4.3. Ensures each procedure is operationally acceptable for the command or unit mission to include evaluation and endorsement each nonstandard procedure.

1.4.4. Ensures civil engineering (CE) or other appropriate agencies provide obstacle and airfield engineering data to support the development and maintenance of required instrument procedures. Engineering maps from the Base Comprehensive Plan are an example of these data.

1.5. Unit TERPS Responsibilities.

1.5.1. Initiate actions essential to the fulfillment of TERPS program objectives assigned by the applicable MAJCOM TERPS function and appropriate directives. When safety or practicality of air navigation is a factor, the TERPS specialist cognizant of the situation will take action to correct the situation.

1.5.2. Establish and maintain a current set of aeronautical source data sufficient to support TERPS development responsibilities. At a minimum, create a GPD globalspace containing the most current DAFIF and DVOF and all available DTED covering each active workspace. Create a workspace (or workspaces) large enough to encompass an area at least 5 NM beyond the area to be protected for the furthest segment/sector of any instrument procedure or chart developed using automation. For example, when the furthest segment of any automated procedure/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. Initiate GPD Auto Eval on the workspace and all archived procedures after ingest of new aeronautical data (DTED/DVOF/DAFIF).

1.5.2.1. Digital products required to support TERPS development include DAFIF, DVOF, DTED (Level 1 and 2, and SRTM data if available), NACO digital VFR sectionals, raster map/imagery products (CADRG, CIB), and vector products (UVMAP, VMAP 0 – 1).

1.5.2.2. Maintain source data (hard- or soft-copy) relating to aeronautical or ATCALS surveys, NAVAID/radar siting, and obstructions (on- and off-aerodrome), and all correspondence relating to manual revisions to aeronautical data.

1.5.3. Develop, process, and maintain instrument procedures to support local flight operations. Prepare procedure packages for instrument approaches, instrument departures (to include diverse departure assessments, ODPs, and SIDs), and Standard Terminal Arrival Routes using the most current

version of GPD software or manual methods, as applicable. Coordinate with all required signatory agencies. Maintain backup copies of all files associated with automated procedure packages on electronic media.

1.5.4. Develop, process, and maintain ATC charts to include Minimum Vectoring Altitude Charts (MVAC), and Minimum IFR Altitude Charts (MIFRAC) to support local USAF ATC facilities. Prepare chart packages using the Chart Designer module of the most current version of GPD software and coordinate with all required signatory agencies. Maintain backup copies of all files associated with automated chart packages on electronic media.

NOTE: Provide notification of new and revised instrument procedures to the installation environmental management (EM) office for environmental impact analysis. Notify wing Airspace Management, when applicable, of new and revised instrument procedures for their evaluation of any effect to local Special Use Airspace or Military Training Routes (MTRs).

1.5.5. Develop, process, and maintain Diverse Vector Areas (DVA) when requested by the Radar CCTLR.

1.5.6. Coordinate all manual edits to aeronautical data (to include obstacles) with the MAJCOM TERPS function.

1.5.7. Maintain TERPS publications IAW **Attachment 1**. Maintain TERPS files IAW USAF, MAJCOM, and wing/base directives.

1.5.8. Develop and maintain a continuity folder including, as a minimum (see MAJCOM supplement, if applicable) the following:

1.5.8.1. Key Personnel.

1.5.8.2. Projects in Progress.

1.5.8.3. Procedure Listing (A current copy of the AFFSA annual audit spreadsheet is acceptable).

1.5.8.4. TERPS Equipment Listing.

1.5.8.5. Listing of Local References (Wing Instruction, DVA OI, ATC Non-Radar training material that may contain rational for TERPS restrictions, etc.).

1.5.8.6. File Maintenance and Disposition Plan.

1.5.8.7. FLIP Cycle Review Log.

1.5.8.8. Copy of completed Annual/Semiannual Self-Inspection ATSEP Checklist. See AFI 13-218, *Air Traffic System Evaluation Program* or the AFFSA/XA website for the latest checklist.

1.5.8.9. Historical listing of all manual changes to aeronautical data, to include the source data, reason for revision, and impact (if none, so state).

1.5.9. Maintain current civil engineering produced (electronic or hard-copy) maps of the following type.

NOTE: CE may maintain Comprehensive Plan maps in a digital or electronic format. MAJCOM and unit TERPS specialists may use any Comprehensive Plan map provided by CE in the digital format or produce paper copy maps from the medium provided by CE.

1.5.9.1. E-1, E-2, and E-3.

1.5.9.2. E-5. Ensure the following items ('layers', as applicable, when working in a GIS format) are included.

1.5.9.2.1. Primary Installation (to the edge of the base property & easements as necessary). This is a plan of existing facilities on the installation. It will be compiled at a scale of 1 inch = 400 feet and will accurately depict the following information.

1.5.9.2.1.1. Runway thresholds latitude and longitude, touchdown zone elevation(s), all NAVAID locations with latitude and longitude.

1.5.9.2.1.2. The designation of the instrument runway. The length, width, true bearing, directional numerals, lateral clearances, clear zones, approach zones, glideslope critical areas, and centerline of each runway shall be included.

1.5.9.2.1.2.1. Location and type of runway, taxiway, threshold, approach, narrow gauge, and centerline light fixtures.

1.5.9.2.1.2.2. Location of runway distance marker system, runway end reference lights, and VASI systems.

1.5.9.2.1.3. Topography (contour interval generally 5 feet and subdued but printable) including vegetation, trees (single and groves, forests, etc).

1.5.9.2.1.4. Existing facilities such as airfield pavements, structures above ground to include all portable buildings (all above ground structures must have building height included), inclusive of utility lines with utility pole height in the layer or on the 'legend' as well as street lighting, apron maintenance lighting, etc. Each structure should be identified by the installation address system and building number.

1.5.9.2.1.5. Streets, parking areas (aircraft & vehicle).

1.5.9.2.1.6. Roads, taxiways, railroads, fuel hydrant outlets, antennas, etc. Taxiways shall be identified by number or letter.

1.5.9.2.1.7. Aircraft maintenance light poles or towers, blast deflectors, and aircraft fueling and defueling outlets.

1.5.9.2.1.8. Helicopter landing areas and clearances applicable for same.

1.5.9.2.2. Facilities located at off-installation sites will be shown at an appropriate scale as insets or on additional sheets, as required.

1.5.9.3. All coordinates must be expressed in the WGS 84 coordinate system to at least the second place past the decimal, with the map being associated to this coordinate system. The State Plane Coordinate System is not an acceptable aeronautical survey format.

1.5.9.4. Verify each map is current annually.

1.5.9.5. If these maps are not available (e.g., FAA provides engineering support), suitable substitutes such as National Geodetic Survey (NGS), Airport Obstruction Charts (AC) and the associated NOAA Aeronautical Data Sheet (ADS) are acceptable. Other engineering maps are optional.

NOTE 1: AFI 32-7062, ***Air Force Comprehensive Planning,*** provides Comprehensive Plan map guidance.

NOTE 2: The CE function is responsible for updating CE products and providing these products to the TERPS function. TERPS functions shall not update CE products. Any USAF developed instrument procedure based on CE airfield obstacle data or a Comprehensive Plan map that has not been updated by CE for more than 2 years requires a waiver from the appropriate MAJCOM/DO for continued use. The applicable TERPS function shall ensure that the appropriate CE function is notified of outdated maps.

1.5.10. Complete FAA Form 8240-22, ***Facility Data Sheet.*** Processing guidance for this form is outlined in **Chapter 2**.

1.5.11. Prepare FAA Form 6050-4, ***Expanded Service Volume Request,*** as required. Completion and processing guidance for this form is outlined in **Chapter 2**.

1.5.12. Review and document procedural data in each new FLIP product is correct IAW paragraph **6.3.** of this AFI.

1.5.13. Complete Section I of AF IMT 813 to initiate the Environmental Impact Analysis Process (EIAP).

1.5.14. Develop ATC radar map data in coordination with the Chief Controller (CCTLR), and the Chief Air Traffic Control Automation (CATCA/ATCSS) IAW AFMAN 13-215.

1.5.15. Provide notification to the CATCT, CSE, TSN, CATCA, CCTLR, and the appropriate FAA facility manager of any revision to an instrument procedure.

1.5.16. Analyze obstruction evaluation (OE) case studies to determine the effects on current and planned instrument procedures and/or ATC charts.

1.5.17. Ensure Airfield Management is provided data on instrument procedures requiring NOTAM action.

1.5.18. Conduct visual inspections of the airfield environment or coordinate with Airfield Management for information relating to new, changed, or removed obstructions.

Chapter 2

TERPS GENERAL

2.1. Holding Pattern Development. Apply holding pattern requirements established in FAA Order 7130.3, *Holding Pattern Criteria,* AFMAN 11-226(I), Volume 1, Chapter 2, Section 9, and the following:

2.1.1. Develop holding patterns to accommodate a maximum holding airspeed of 310 knots indicated airspeed (KIAS). If this cannot be accomplished, the maximum airspeed allowed shall be published in the plan view of the procedure, adjacent to the holding pattern.

2.1.2. When designing a new procedure, select the maximum holding altitude based on the highest anticipated altitude that will be used by ATC.

2.1.3. At locations where the USAF has instrument procedure development responsibility, military and FAA ATC facility management, including adjacent facilities with Approach Control responsibility, shall be made aware of all limitations (maximum speed and/or altitude) associated with each holding pattern. When applicable, provide any restrictions related to turbulent air holding. See FAA Order 7130.3, Chapter 3 for additional guidance.

2.1.4. Evaluate holding patterns based on the DME slant range effect regardless of the altitude specified or the difference between slant range and geographical distance.

2.1.5. Holding patterns shall be documented on FAA Form 8260-2, ***Radio Fix and Holding Data Record*** (see paragraph **2.3.5.**).

2.2. Separating Instrument Procedures From Special Use Airspace (SUA). Ensure that a SUA check is performed on all procedures developed in GPD prior to export (not applicable to ATC charts or diverse departures). Primary obstacle clearance areas of instrument approach procedures and SIDs (with the exception of ESA and MSA) shall not extend into SUA *except when one or more* of the following conditions exist:

2.2.1. The ATC facility authorized to clear aircraft for the instrument procedure is designated as the controlling agency for the SUA.

2.2.2. ATC radar is operational and used to ensure separation from the SUA in those cases where the ATC facility has control responsibility for the instrument procedure, but is not the controlling agency for the SUA (see FAA Order 7110.65, Chapter 9, Section 4, *Special Use and ATC Assigned Airspace* for additional guidance).

NOTE: When ATC radar is used, the procedure must specify the restrictions, e.g., "RADAR REQUIRED" or "RADAR REQUIRED WHEN HOLDING ABOVE 10,000."

2.2.3. 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 and non-participating aircraft performing the instrument procedure.

NOTE: Coordinate with the local military airspace manager for matters concerning Special Use Airspace (SUA). Coordinate with the supporting MAJCOM and with the FAA AFREP for all other airspace matters.

2.2.4. When the GPD SUA check indicates a conflict that will be mitigated by one or more of the rules in paragraphs **2.2.1.**, **2.2.2.**, or **2.2.3.** above, enter the details in the 'Justification' tab. For example: "IAW AFI 11-230, para **2.2.1.**, XYZ Approach Control is the controlling agency for R-3202A and for the instrument procedure". Completion of the 'Alternative', 'Equivalent', or 'Organization' tabs is only required when pursuing a waiver.

2.3. Navigational Fixes. Requirements established in FAA Order 8260.19, Chapter 2, Section 10, *Navigational Fixes*, and as supplemented in this paragraph, shall be used for fix processing. The Unit TERPS function shall submit a request for fix names through their supporting MAJCOM. The MAJCOM TERPS function shall obtain fix names from the FAA National Flight Data Center (NFDC), Airspace Section.

2.3.1. Fix names shall be documented on FAA Form 8260-2, ***Radio Fix and Holding Data Record*** (see paragraph **2.3.5.**).

2.3.2. Assign NFDC obtained fix names to all navigation fixes developed for en route and terminal instrument flight procedures IAW FAA Order 8260.19, Chapter 2, Section 10. This is necessary to ensure harmonization between information depicted on aeronautical charts and the corresponding data documented in aeronautical databases.

2.3.3. Unit TERPS functions will notify their supporting MAJCOM when fix names are no longer required. Fix names no longer required will be returned to the NFDC by the MAJCOM.

2.3.4. Fix names obtained by the MAJCOM from NFDC for navigational fixes overseas shall be coordinated with and approved by the country with jurisdiction over the airspace where the fix is located prior to publishing the procedure in the DoD FLIP. These fix names shall be documented and processed IAW paragraph **2.3.**. MAJCOMs shall specify procedures for coordinating with host nation aviation authorities to obtain approval and to delete fix names no longer needed in a supplement to this AFI.

2.3.5. Use the following web site **http://av-info.faa.gov/terps/TERPS%20Forms.htm** to download FAA Form 8260-2. The instructions for completing this form are located in FAA Order 8260.19, Chapter 8.

2.3.5.1. The unit TERPS function will complete the FAA Form 8260-2 and forward the form through their supporting MAJCOM for processing IAW FAA Order 8260.19. The completed FAA Form 8260-2 must be forwarded by the MAJCOM to AVN-160.

2.3.5.2. FAA Form 8260-2's supporting RNAV procedures shall be processed and approved by AVN-160 prior to publishing the procedure. Non-RNAV instrument procedures may be published once fix names have been obtained/reserved through the NFDC.

2.3.5.3. When processing FAA Form 8260-2, ensure the form is coordinated with the parent FAA or military air traffic facility, as appropriate, in Item 6, ATC COORDINATION, prior to being forwarded to the supporting MAJCOM.

2.3.5.4. When submitting an instrument procedure to NGA for publication or revision, the MAJCOM shall include all applicable approved 8260-2's with other required documentation.

2.4. NAVAID Service Volume. See GPD Operations Manual Vol. II, Chapter 8. Ensure that a NAVAID service volume check is performed on all non-RNAV procedures developed in GPD prior to export (not applicable to ATC charts or diverse departures). NAVAID standard service volumes are listed in FAA

Order 8260.19 and FAA Order 7110.65. When the primary area of any segment (including holding) extends beyond the standard service volume of the applicable NAVAID(s), an Expanded Service Volume (ESV) evaluation is required. Document ESV requests on FAA Form 6050-4.

2.4.1. A blank (fillable) FAA Form 6050-4 is included in each GPD export package. Alternatively, it may be downloaded from **http://www.faa.gov/ats/aaf/asr/library/downloads.htm**. Complete Part I of FAA Form 6050-4, ***Expanded Service Volume Request*** as follows;

2.4.1.1. Enter your complete office symbol; include mailing address in the 'From *(Originating Office)*' space. Include the airspace docket number only if the request is associated with an airspace action. Enter the state where the NAVAID is located. Check 'establish', 'revision', or 'cancel', as appropriate.

2.4.1.2. Facility Data. Enter the NAVAID facility name (as charted) and identifier in the 'Chart Name' space. Also enter the facility class and type (i.e.; T-VOR; L-DME; H-VORTAC), the city where the NAVAID is located, and the frequency/channel of the NAVAID.

2.4.1.3. Expanded Service Volume Data. Enter the radial(s), distance, minimum and maximum MSL altitudes desired, and the operational use requirements that are beyond the standard service volume. The name and rank of the procedure specialist shall be printed under the specialist's signature. Enter the individual's organization and office symbol in 'Facility', and enter the date of the request.

2.4.1.4. Do not make any entries in Parts II or III.

2.4.1.5. Forward the completed form to your supporting MAJCOM for further processing.

2.4.2. The MAJCOM shall validate the requirement and submit it to the appropriate regional AFREP who shall forward the request to the Regional Frequency Management Officer (FMO). The FMO shall determine if the desired frequency protections can be guaranteed. The FMO will also do an engineering analysis to determine whether or not the signal strength, provided at the worst-case points of the service volume, complies with spectrum management minimum principle requirements. The FMO will indicate approval or provide alternatives to limitations for ESV checks. A flight inspection will be performed to confirm the engineering analysis and to determine that a usable, interference free signal is available throughout the desired volume of airspace.

NOTE: Frequency management guidance can be found in FAA Order 6050.32, Spectrum Management Regulations and Procedures Manual.

2.4.3. When the ESV request is reviewed and approved by all required agencies, file the request with all affected instrument procedures. When there is no longer a requirement for an established ESV, the originating office shall cancel it and notify all concerned agencies. ESVs shall be reviewed at least biennially to validate the requirement.

2.4.4. Consider restrictions to NAVAIDs when developing instrument procedures. All segments of the instrument procedure shall fall within useable radials/ranges of the applicable NAVAID.

2.5. Airspace Requirements. Ensure each instrument procedure's 'primary obstruction clearance area' is within controlled airspace within the United States and where required by host nation regulations. The following criteria apply:

2.5.1. Altitudes or heights established must be at least 300 feet above the Floor of Controlled Airspace (FOCA), except that these altitudes or heights may be rounded to the nearest 100 feet. Outside the United States, procedures must be contained within controlled airspace according to host nation criteria.

2.5.2. Outside of Class C/D airspace (and extensions) and Class E airspace use ATC IFR separation standards (see FAA Order 7110.65, Chapters 5 and 6).

2.5.3. In Class C/D airspace (including extensions) and Class E airspace use the criteria in FAA Odrer 7400.2 and FAA Order 8260.19.

2.5.4. Ensure all circling areas remain within the lateral confines of Class D/E Surface Areas and/or extensions. When not possible, publish Circling Minimum Descent Altitudes (CMDA) at least 300 feet above the FOCA.

NOTE: When raising the published CMDA only to accommodate FOCA requirements (not obstacles), a flight inspection is not required.

2.5.5. When new or revised instrument procedures require establishing or changing airspace, contact the regional AFREP.

2.5.6. When using GPD, display digital VFR sectionals to assist in evaluating instrument procedures against the FOCA (see **Chapter 9**, paragraph **9.1.3.4.1.**).

2.5.7. Environmental Impact Analysis Process. Complete Section I of AF IMT 813 to initiate the Environmental Impact Analysis Process (EIAP) when making altitude or flight track changes to existing instrument procedures or when developing new instrument procedures.

NOTE: Comply with EIAP program guidance contained in the Code of Federal Regulations (CFR), specifically, 32 CFR, Part 989, Environmental Impact Analysis Process.

2.5.7.1. 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.

2.5.7.2. 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 AICUZ.

2.6. Magnetic Variation (MV) Changes. FAA Order 8260.19, *Flight Procedures and Airspace*, Chapter 2, Section 5, shall be used when applying MV values. MAJCOMs shall coordinate with FAA AVN-160 to obtain MV of record to be applied to new, relocated, and existing NAVAIDs/airports. Once obtained, it is the responsibility of the MAJCOM to provide the National Flight Data Center (NFDC), Airports, Facilities and Communications Division, with any MV updates. MAJCOMs shall inform their supported units when revisions to instrument procedures are required due to a change to the MV of record.

NOTE: When host nation directives do not direct how MV changes are to be applied at US military installations overseas, apply the criteria in FAA Order 8260.19 criteria to the maximum extent possible.

2.7. Visual Flight Rules (VFR) Procedures. When a "flight procedure" has not been evaluated to ensure compliance with TERPS criteria and all that goes with it (flight inspection, etc.), it cannot be flown in Instrument Meteorological Conditions (IMC), and is limited to use under basic VFR weather minimums as stipulated in the Code of Federal Regulations (CFR), Title 14, Part 91, Sub-part 91.155.

2.7.1. These procedures may be published in local flying directives and/or in a loose-leaf format; they shall not be published in the DoD or NACO FLIP.

2.7.2. Ensure the caveats "FOR USE UNDER BASIC VFR WEATHER MINIMUMS ONLY" and "PILOT IS RESPONSIBLE FOR TERRAIN/OBSTACLE AVOIDANCE" are included in both the planview of graphically depicted instrument procedures and in each VFR procedure published in textual format.

2.7.3. Procedure identification.

2.7.3.1. Naming can be accomplished IAW TERPS naming conventions as long as the procedure is identified as "NOT FOR USE IN IMC."

2.7.3.2. 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)".

2.7.4. Replace the entire minima line (MDA, HAT/HAA, DA/DH, ceiling and visibility) with "VFR".

2.7.5. Procedures published IAW this paragraph do not require formal review and processing, flight inspection, or waiver action for deviations to TERPS criteria.

2.8. FAA Forms and Publications.

2.8.1. When unable to download FAA forms referenced throughout this instruction from FAA websites, they may be requested from the FAA forms officer via commercial facsimile number (202) 267-5407. The FAA forms officer will submit your request to the appropriate FAA program office. The program office will either fax a hard copy or email an electronic copy of the requested form to you. Ensure your request to the FAA forms officer includes your email address and facsimile number.

2.8.2. FAA publications referenced in AFMAN 11-226(I) and this instruction are approved for USAF use as stated. Example, AFMAN 11-226(I), Volume 1, Chapter 2, Section 9, refers you to FAA Order 7130.3 for holding criteria. This instruction (AFI 11-230) makes reference to FAA Order 8260.19 for instructions on filling out FAA Form 8260-2, ***Radio Fix and Holding Data Record***. The first example allows you to apply all applicable criteria within the publication as stated, where the second example allows you to apply only a portion of the FAA publication.

2.8.3. **Attachment 1**, *Glossary of References, Abbreviations, Acronyms, and Terms*, is provided for the TERPS specialist for two purposes. The first is to establish a requirement for the TERPS specialist to maintain certain publications necessary in the performance of his/her duties. The second purpose is to provide a list of reference publications that could assist TERPS specialists in the performance of his/her duties.

NOTE: **Attachment 1** is not to be considered a list of approved FAA publications. Certain portions of these publications may be approved for USAF use and will be identified as such in USAF publications.

2.8.4. FAA General Policy Letters, formerly TERPS Instruction Letters (TILS). General Policy Letters are internal documents for FAA use only. HQ AFFSA/XOI reviews them for applicability to the

USAF TERPS mission. Pertinent guidance and/or criteria changes in FAA General Policy Letters shall not be applied by USAF TERPS functions unless directed by HQ AFFSA/XOI.

2.8.5. FAA Form 8240-22, Facility Data (see paragraph **2.8.1.** for instructions on obtaining this form). Use whole number values when documenting the magnetic variation of record on this form.

2.8.5.1. For USAF owned/operated NAVAIDs, complete and maintain FAA Form 8240-22 for each NAVAID and VGSI at the airport.

2.8.5.2. Complete FAA Form 8240-22 IAW FAA Order 8240.36, *Instructions for Flight Inspection Reporting, Appendix 22*.

NOTE: Only source documentation (survey data, engineering maps, etc.) shall be utilized as source for applicable blocks of the form. Previous Facility Data Sheets shall not be considered as "source" material. Maintain source documentation with the applicable Facility Data sheet.

2.8.5.3. Unit TERPS shall forward the completed FAA Form 8240-22 to their parent MAJCOM for review and approval. MAJCOMs shall forward the FAA Form 8240-22 to AVN-210 (Flight Inspection Technical Support Branch) for processing. AVN-210 must process new or modified NAVAID information prior to the flight inspection of the facility.

2.8.5.4. When changes are made to a military facility, USAF Base Operations is responsible for non-procedural changes required in DoD FLIPs, e.g., Enroute Supplement, airport diagrams, etc.

NOTE: Additionally, the MAJCOM shall forward all approved FAA Form 8240-22'S associated with facilities in CONUS and Alaska to the AFFSA XOIA mailbox at **mailto:affsa.xoia@andrews.af.mil**. AFFSA XOIA will attach the approved forms to the Flight Information List (FIL) and send them to the National Flight Data Center (NFDC). Appropriate data will be extracted by NACO and added to the Airport Facility Directory (A/FD).

2.8.6. Evaluating New Construction and Alterations to Current Obstructions. Title 14 of the Code of Federal Regulations (CFR), Part 77, requires that notification be provided to the FAA on proposed construction or alteration of structures that might present a hazard to flight. Copies of OE case studies and FAA determinations may be obtained from the FAA website (**http://oeaaa.faa.gov**).

2.8.6.1. FAA Form 7460-1, Notice of Proposed Construction or Alteration, is the form that documents the proposal.

2.8.6.2. The appropriate FAA region has the responsibility to process all FAA Forms 7460-1 in accordance with CFR Part 77 and FAA Order 7400.2, Procedures for Handling Airspace Matters. The FAA Region Air Force Representative (AFREP) will forward the OE/AAA Letter, Part 77 results, and obstacle accuracy code information to the affected military installation for evaluation and recommendations by the TERPS function.

2.8.6.3. When reviewing the information, the TERPS Specialist will evaluate the proposal for impact to the following:

2.8.6.3.1. Terminal Area IFR Operations. Evaluate the effect upon terminal area IFR operations; e.g., transitions, radar vectoring (MVAC), Minimum IFR altitudes, holding, STARs, and Departure Procedures.

2.8.6.3.2. Instrument Approach/Departure Procedures. Evaluate the effect upon any segment of an Instrument Approach Procedure (IAP). Also evaluate the effect upon any proposed IAP or any departure restriction.

2.8.6.4. Adjustments to Instrument Flight Procedures. Do not disregard proposed construction that impacts TERPS procedures (including MVA, MIFRAC, etc.) regardless of the severity of the impact or whether adjustment to the procedure is feasible. The TERPS Specialist shall not amend any instrument procedure until receipt of the FAA Form 7460-2, Notice of Actual Construction or Alteration, or other notification relative to an obstacle that will have an effect on current or proposed operations/procedures. Whenever it becomes obvious that the existence of a previously unknown obstacle requires procedure minima to be raised for safety reasons, expedite accomplishment of the change by means of a NOTAM.

2.8.6.5. Impact Notification and Recommending Solutions. When the proposed construction or alteration will have any impact on IFR aircraft operations, procedures, or minimum IFR altitudes, the response back to the FAA Region AFREP should clearly state the extent of the impacts and if possible, provide an acceptable solution. For example; "If the proposed antenna is reduced by XX feet, there would be no adverse impact to instrument procedures". Do not consider adjustments to instrument procedures as an acceptable solution. Any adverse impact to operations and/or instrument procedures should also be brought to the attention of Wing flying officials (DO, Stan Eval, etc.). Maintain a file copy of all proposals. The rationale for this filing is that construction could be delayed for various reasons and the same proposal may resurface one or two years later.

2.8.6.6. Obstacles of Variable Height or Location. An obstacle 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. Procedures for control of these types of obstacles must be outlined in a Local Operating Procedure.

2.8.6.7. Obstruction Evaluation (OE) and Airport/Airspace Analysis (AAA). Policy and procedure responsibility for the USAF OE/AAA Program is located within HQ USAF XOO-CA. The OE/AAA system is designed to identify impact to operations at military airfields and heliports. The OE/AAA automation program incorporates a Military Part 77 surface evaluation, military VFR traffic pattern, circle searches, distance, calculation, and datum conversion capabilities.

2.8.6.7.1. OE/AAA Program Manager Responsibilities. The program manager is responsible for providing policy and guidance to Regional AFREP OE/AAA specialists and to ensure these personnel are trained on the functionality of the OE/AAA web-based system. The program manager interfaces with other DoD service OE/AAA Program Managers, the FAA Program Manager, AFFSA, and AFCESA as changes to policy occur and ensures these changes are disseminated to the AFREP OE/AAA specialists. Because numerous changes and modifications are on-going to the OE/AAA web-based system, the program manager will test the system to ensure accuracy and work with program specialists to correct errors.

2.8.6.7.2. Regional AFREP OE/AAA Specialist Responsibilities. The Regional AFREP OE/AAA specialist is responsible for ensuring the OE/AAA program is executed at least three days per week to meet the FAA 30 day response requirement to the proponent. Each AFREP OE office will make every effort to forward case studies to the responsible TERPS agency with enough lead-time to allow a full 10 working day review/response period. When this is not possible, the AFREP OE office must notify the responsible TERPS agency and provide a rea-

sonable alternative suspense; an actual date is preferred over 'ASAP', 'Immediately', or 'Rush'.

2.8.6.7.2.1. Information on structures identified as having the potential to impact airfield operations shall be distributed directly to the TERPS point of contact via the system generated airfield letter for further evaluation. Part 77 evaluation results and obstacle accuracy code information shall also be provided.

2.8.6.7.2.2. When 10 working days have elapsed and no response has been received from the appropriate TERPS agency and/or an extension has not been requested/approved, the responsible AFREP OE office will forward the case study to the next higher level TERPS authority (MAJCOM TERPS when the OE was originally forwarded to a unit TERPS office, or to AFFSA/XOIP when the OE was originally forwarded to a MAJCOM TERPS office) for immediate resolution or comment.

2.8.6.7.3. FAA Air Traffic Division OE Technicians/Specialists Responsibilities. The FAA Air Traffic personnel are responsible for ensuring the information submitted on the Notice of Proposed Construction, FAA Form 7460-1, and/or the on-line submission is verified correct and entered into the OE/AAA system for further coordination/evaluation by the AFREP offices. In accordance with CFR Part 77, paragraph 77.19, FAA OE Specialists have 30 days to respond to the proponent unless circumstances warrant further study.

2.8.6.7.4. FAA Airports Division/Airports District Office Specialist Responsibilities. The FAA Airports personnel are responsible for ensuring the information submitted on the Notice of Landing Area Proposals, FAA Form 7480-1, is verified correct and entered into the OE/AAA system for further coordination/evaluation by the AFREP offices.

2.8.6.7.5. Air Force Flight Standards Agency Responsibilities. Any changes pertaining to the OE/AAA Program shall be coordinated with the Air Force OE/AAA Program Manager. These changes include programming issues relating to the OE/AAA Program due to requirements in conjunction with GPD or administrative changes to enhance the protection of military airfields.

2.8.6.7.6. USAF TERPS Function Responsibilities. MAJCOM/Unit TERPS personnel are responsible for evaluating effects of proposed construction/alteration to instrument procedures in accordance with FAA Order 7400.2 and applicable USAF directives. Results of the evaluation shall be forwarded to the AFREP office within ten working days of receipt to facilitate compliance with FAA response requirements to the proponent.

2.8.6.7.6.1. When the responsible TERPS agency (MAJCOM or unit TERPS function) has higher priority duties that prevent completing the evaluation and forwarding the results within 10 working days, they must contact the applicable AFREP OE office and request an extension prior to the suspense date.

2.8.6.7.6.2. When the TERPS agency cannot meet a short suspense, they may either request an extension from the Regional AFREP OE/AAA Specialist or contact the next higher level TERPS authority for assistance.

2.8.6.7.6.3. When the evaluation reveals operational impact to terminal area IFR operations or to instrument procedures, document all aspects of the impact in detail and provide alternatives such as lowering or relocating the structure.

2.8.6.7.6.4. When the case study is evaluated by other than the affected TERPS agency (see paragraph **2.8.6.7.2.2.**), the MAJCOM TERPS office or AFFSA/XOIP, as applicable, will evaluate the case study and provide comments to the AFREP OE office with a courtesy copy to the affected TERPS agency.

2.8.6.7.6.5. Units shall notify their MAJCOM when changes occur in OE contact information (i.e. POC, phone number, office symbol, e-mail address, etc.). MAJCOMs shall coordinate any changes in the distribution of OE cases with AFFSA XOI, who will intern coordinate the changes with HQ USAF XOO-CA.

2.9. Special Aircrew Training. Certain instrument procedures will require one of the following notes to be published on the approach plate: "Special Aircrew Certification Required" or "Special Aircrew and Aircraft Certification Required." This applies to CAT II/III ILS procedures, and as required in FAA directives on some Foreign Terminal Instrument Procedures. Unique procedures that ***do not*** fall into one of the two areas listed above but require one of the caveats listed, shall not be published in the DoD FLIP (i.e., a unique instrument procedure has been developed requiring "special aircrew training" and is not a CAT II/III ILS procedure) is a special use procedure (paragraph **5.8.** applies) and will be controlled by the developing unit/MAJCOM and published 'loose-leaf' only.

NOTE: Except for CAT II/III procedures (these requirements are already covered in AF and MAJCOM flying directives), the unit/MAJCOM responsible for the procedure will be the point of contact for addressing these special training/aircraft requirements and a method to contact the unit/MAJCOM will be annotated on the procedure.

2.10. Climb Gradients (CG). IAW AFI 11-202, Vol. 3 and AFMAN 11-217, Vol. 1, the standard climb gradient for departures and missed approaches is 200 ft/NM. When a higher rate of climb is required for obstacle avoidance and/or to meet Air Traffic Control (ATC) restrictions, the climb rate required shall be specified on the procedure IAW IACC and NGA/DoD product specifications. A climb gradient that exceeds 200 ft/NM for a missed approach procedure requires a waiver.

NOTE: A climb gradient that exceeds 200 ft/NM for a departure procedure does not require a waiver, however, the TERPS specialist and reviewing authorities should assess whether the climb gradient is sensible and attainable based on the various types of aircraft subject to using the departure procedure.

2.10.1. A 'climb-to' altitude shall be specified where the standard climb rate can be resumed when a climb gradient (obstacle and/or ATC) is published.

2.10.2. When a climb gradient is required to avoid obstacles, it shall be identified as a "Minimum Climb Rate."

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

2.10.4. An ATC climb gradient shall not be published in lieu of an obstacle driven climb gradient that is also required.

2.10.4.1. There may be occasions when there is a necessity to publish an ATC Climb Rate in conjunction with an obstacle driven climb rate.

2.10.4.2. The ATC climb rate may be negated by ATC and will always be greater than an obstacle driven climb rate.

2.10.5. Missed Approach Climb Gradients.

2.10.5.1. Calculate missed approach climb gradients in the CONUS, Alaska, and Hawaii using the applicable (precision or non-precision) criteria in **Attachment 4**, paragraph **A4.10.1.** and paragraph **A4.10.2.**. When an operational advantage (lower climb gradient) can be achieved and is desired for locations in the CONUS, Alaska, and Hawaii, use the relevant (precision or non-precision) criteria outlined in **Attachment 4**, paragraph **A4.10.3.** for OCONUS locations to calculate this climb gradient. When the option in paragraph **A4.10.3.** is used for locations in the CONUS, Alaska, and Hawaii, add the note "NOT FOR CIVIL USE" and process the instrument procedure as nonstandard.

NOTE: When a nonstandard missed approach climb gradient is currently published due to obstacles or ATC, application of the relevant (precision or non-precision) criteria in **Attachment 4**, paragraph **A4.10.** may result in an increase to the current nonstandard climb gradient. When this is the case, a new waiver will be required for the higher climb gradient.

2.10.5.2. MAJCOM and unit level TERPS functions shall re-validate each missed approach climb gradient waiver as the current waiver expires.

2.10.6. Departure Climb Gradients.

2.10.6.1. Apply AFMAN 11-226(I), Vol. 4, paragraph 1.4.1 (Standard Formula) when calculating departure climb gradients in the CONUS, Alaska, and Hawaii.

2.10.6.2. When an operational advantage (lower climb gradient) can be achieved and is desired for locations in the CONUS, Alaska, and Hawaii, apply the DoD Option from AFMAN 11-226(I), Vol. 4, paragraph 1.4.1. When this option is used, add the note "NOT FOR CIVIL USE"; *waiver action is not required*.

2.10.6.3. The DoD Option shall also be applied to all departure procedures at OCONUS, including host nation locations and all OCONUS locations where the USAF exercises TERPS authority.

2.10.6.4. Round the result of either formula up to the next 10-foot increment and publish the rounded up value as the departure climb gradient.

Chapter 3

INSTRUMENT DEPARTURE PROCEDURES/RADAR DIVERSE VECTOR AREAS

3.1. General. Develop departure procedures (DPs) IAW AFMAN 11-226(I), *United States Standard for Terminal Instrument Procedures (TERPS)*, Volume 4, *Departure Procedure Construction,* and FAA Order 8260.46, *Departure Procedure (DP) Program.* Use the USAF Global Procedure Designer (GPD), when developing diverse departures. Follow the workflow process outlined in the GPD Operations Manual Volume 4, paragraph 1.2, to ensure the correct assessment of diverse departures/ODPs. When required, develop departure routes (either SID or ODP) manually and document on AF IMT 3634 (see paragraph **3.4.**).

NOTE 1: When USAF is the IFR controlling facility for satellite airports where another agency is responsible for instrument procedure development and a DVA is required (see paragraph **3.3.14.**), obtain diverse departure assessment results from that agency.

NOTE 2: The next release of GPD will have the capability to develop departure routes (to include SIDS, RNAV SIDS, ODP routes) and VCOAs.

3.1.1. DPs developed to portray specific departure routes required by Air Traffic Control (ATC) and operational agencies are referred to as ‘Standard Instrument Departures’ (SIDs).

3.1.2. DPs developed to assist pilots in avoiding obstacles are referred to as ‘Obstacle Departure Procedures’ (ODPs).

3.1.3. Do not develop an ESA or MSA for a departure procedure.

3.1.4. Do not consider DPs with an ATC or obstacle driven climb gradient as ‘nonstandard’; i.e., do not pursue waiver action for any DP that requires publication of a climb gradient.

3.2. RNAV Departure Procedures. Use FAA Order 8260.44, *Civil Utilization of Area Navigation (RNAV) Departure Procedures*, and other applicable FAA orders when developing RNAV departure procedures.

3.3. Departure Criteria. Use these criteria in conjunction with the specified paragraphs, as indicated, in AFMAN 11-226(I), Volume 4.

3.3.1. Diverse departure assessments and diverse ODPs will be documented in the departure procedure build output of GPD and published in a text or graphic format, depending on complexity. Complex ODPs that are obstacle driven shall be published as a graphic and shall be identified in the "IFR Take-Off Minimums and (Obstacle) Departure Procedures" portion of the FLIP.

3.3.1.1. When the procedure requires an obstacle avoidance climb gradient in excess of 200 ft/NM, a ceiling and visibility shall also be published for civil users.

3.3.1.2. Climb gradients, with an unrounded ‘climb to’ altitude of 200 feet above DER elevation or less, shall not be specified, however, the obstacles requiring such a climb gradient shall be identified in the IFR Take-Off Minimums and (Obstacle) Departure Procedures section and on the graphic.

3.3.2. All departure procedures are subject to flight inspection IAW AFMAN 11-225, Section 214 to include ODPs.

3.3.3. Publication of a SID does not eliminate the need to publish an ODP when a penetration to the diverse departure 40:1 OCS exists. The ('Delta T') symbol will be placed on all instrument approach and departure procedures when the diverse departure assessment results in 40:1 penetrations.

3.3.4. Radar vectors may be available to aircrews as a departure method; however, aircraft shall not be vectored below the Minimum Vectoring Altitude (MVA) on departure unless a Diverse Vector Area (DVA) has been evaluated and established (see paragraph **3.3.14.** and AFI 13-203, *Air Traffic Control,* regarding DVAs).

3.3.5. When the FAA or host nation is the IFR controlling facility for the airport, coordinate all departure procedures through the appropriate facility manager.

3.3.6. Minimum and ATC climb rates shall be published as vertical velocity tables.

3.3.6.1. Supported units shall forward diverse departure documentation, the departure procedure package (when required), and all associated drawings to the parent MAJCOM TERPS office for review and approval.

3.3.6.2. When applying departure sector criteria in AFMAN 11-226(I), Volume 4, Chapter 2, Paragraph 2.2, climb gradients in excess of 200 ft/NM are not authorized.

3.3.7. Paragraph 1.3.1.; Low, Close-in OCS Penetrations. A ceiling and visibility shall not be published to see and avoid close-in obstructions for DPs published solely for military use.

NOTE: Raising the OIS origin height does not mitigate the requirement for low, close-in obstacle notes.

3.3.7.1. When publishing DPs in the DoD FLIP, annotate the location of close-in obstacles on both graphic DPs and on textual DPs. See FAA Order 8260.46, Appendix 5, block (4), item 2 for guidance and sample notes.

3.3.7.2. Taxiing and/or parked aircraft are to be considered as obstructions when evaluating the departure obstacle clearance surface (OCS). When it is possible for taxiing/parked aircraft to penetrate the departure OCS, these potential obstacles shall be depicted as if they were fixed obstacles on the DP IAW paragraph **3.3.7.1.**

3.3.7.3. When an obstacle requires a climb gradient in excess of 200 ft/NM to a 'climb to' altitude greater than 200 feet above the DER elevation, you may attempt to reduce or eliminate the CG by specifying a minimum crossing height (screen height) above the DER elevation (see paragraph **3.4.10.**).

3.3.7.3.1. Use this height as the 40:1 OCS origin height when calculating the climb gradient.

3.3.7.3.2. When this option is used to mitigate a penetration to the 40:1 OCS and a climb gradient is not published, identify graphically the description, height, and location of the obstacle in relation to the DER that would have caused the climb gradient IAW paragraph **3.3.7.1.** had this option not been used.

3.3.8. Paragraph 1.4.1.; Calculating Climb Gradients to Clear Obstacles.

3.3.8.1. At CONUS, Alaskan, and Hawaiian USAF locations, use the Standard Formula from AFMAN 11-226(I), Volume 4, Chapter 1, to determine the departure CG. When an operational advantage can be achieved, use the DoD Option formula from the same reference.

3.3.8.1.1. When the DoD Option formula is used, publish the note "NOT FOR CIVIL USE" on the planview of the graphic or in the IFR Take-Off Minimums and (Obstacle) Departure Procedures section of the FLIP.

NOTE: GPD does not have the ability to calculate climb gradients/climb to altitudes IAW the DoD option for diverse departures. Develop the procedure using GPD to determine the penetrating obstacles, and then manually calculate the climb gradient required for the controlling 40:1 penetrations. Document all manual calculations and include them in the procedure package.

3.3.8.1.2. Annotate in the remarks of the electronic procedure that the DoD option is being applied. Include all manual calculations (clearly indicating which option is being applied) in the SID/route procedure package.

3.3.8.2. At host nation locations and all USAF OCONUS locations where the USAF 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. Manually calculate the CG and document as described in paragraph **3.3.8.**. The DoD option is not applicable for procedures designed/published/reviewed IAW USAF International criteria (see **Attachment 9**).

NOTE: The result of either formula establishes the baseline climb gradient used to compute vertical velocity.

3.3.8.3. Minimum or ATC climb gradients (expressed as ‘ft/NM’) shall be converted to a ‘feet per minute’ value prior to publishing as a vertical velocity value as follows.

3.3.8.3.1. Calculate the V/V for each 60-knot ground speed increment by multiplying the climb gradient by the appropriate ground speed and then dividing by 60. The resulting value will be rounded up to the next 10-foot increment for each ground speed increment and then published as a V/V.

3.3.8.3.2. Example: the V/V for 60 knots based on a computed climb gradient of 253 ft/NM would simply be rounded up to 260. The V/V for 120 knots based on the same climb gradient (253 ft/NM) would be ‘510’ (253 x 120 = 30360. 30360 / 60 = 506. Round 506 up to 510). Based on this example, the V/V for 180 knots would be ‘760’; the V/V for 240 knots would be ‘1020’, etc.

3.3.9. Paragraph 1.4.2., Calculating the CG Termination Altitude. When calculating the ‘climb to’ altitude (the point where the CG is no longer necessary), use the un-rounded CG from either of the formulas from Paragraph 1.4.1., Calculating Climb Gradients to Clear Obstacles. Publish ‘climb to’ altitudes in 100-foot increments. When the un-rounded value falls between two 100-foot increments, the published value shall be rounded up to the higher 100-foot increment. Show all manual climb to altitude calculations and include in package documentation.

NOTE: When the controlling obstacle is in the secondary area, calculate the ‘equivalent height’ value of the controlling obstacle by reducing its actual MSL value by the amount of rise in the secondary area from the edge of the primary area to the obstacle. Calculate the CG and ‘climb to’ altitude as if the obstacle was located in the primary area.

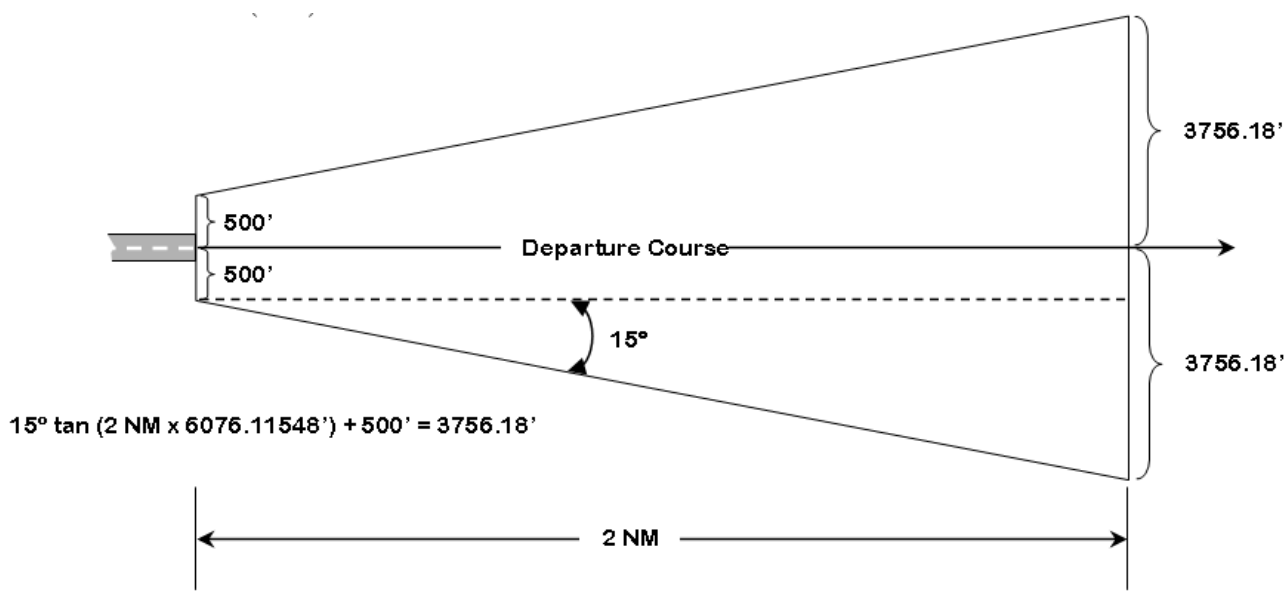
3.3.10. Paragraph 1.4.3., Climb Gradients to Altitudes for Other than Obstacles, i.e., ATC. The distance used to calculate the ATC climb gradient to an altitude is measured in the same manner as for obstacles.

3.3.11. Paragraph 1.4.4., Multiple Climb Gradients Application. Paragraph 1.4.4. applies to obstacle driven climb gradients only. When a departure utilizes multiple transitions, evaluate each transition separately and publish the climb gradient from DER to the obstacle requiring the highest climb gradient for that transition. When it is determined that a common climb rate can be applied to multiple transitions, publish a single climb rate for all applicable transitions.

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.

3.3.12. Paragraph 1.6.2; Area (also applies to Vol. 4, paragraph 3.1). The area splays from the 500-foot point, perpendicular to the centerline at DER. See **Figure 3.1.**.

Figure 3.1. Initial Climb Area (ICA) Construction



3.3.13. Paragraph 1.6.2.a; Length. Ensure the Initial Climb Area (ICA) is long enough for an aircraft to reach 400 feet above airport elevation.

3.3.13.1. When a climb gradient in excess of 200 ft/NM is used to reduce the length of the ICA to less than 2 NM, calculate the ICA length using the following formula:

$$\frac{c + (A-o)}{CG} = \text{Length of ICA in NM}$$

c = initial "climb to" altitude (normally 400')

A = Airport elevation

o = DER elevation + DER crossing restriction

3.3.13.2. When an initial climb to an altitude less than 400 feet above the airport elevation is used to reduce the length of the ICA to less than 2NM, the departure is nonstandard and requires waiver processing. The note "NOT FOR CIVIL USE" shall be published when this option is used.

3.3.14. Paragraph 2.3; DVA Evaluation (ASR Required). A Diverse Vector Area (DVA) is required if an aircraft executing departure/climb-out instructions will be vectored below the Minimum Vectoring Altitude (MVA) or Minimum IFR Altitude (MIA). Where the IFR controlling agency is the FAA/Host Nation, the responsibility for determining the need and/or development of a DVA, lies with that agency (see paragraph **3.3.4.**). At locations where the USAF is responsible for vectoring departing aircraft (including from satellite airports) and when requested by the Radar Facility manager, develop DVA information as follows:

3.3.14.1. Perform a diverse departure obstacle assessment IAW AFMAN 11-226(I), Volume 4, Chapter 2. When this assessment reveals no penetrations to the 40:1 OCS, inform the Radar Facility manager that aircraft on departure may be vectored below the MVA/MIA provided the aircraft's climb to an altitude at or above the MVA/MIA is not interrupted.

3.3.14.2. When penetrations to the OCS are encountered, take one or more of the following actions to avoid these obstacles;

3.3.14.2.1. Establish sectors,

3.3.14.2.2. Isolate the penetrating obstacle(s),

3.3.14.2.3. Determine a DER crossing height (not to exceed 35 feet above DER elevation), and/or

3.3.14.2.4. Develop a climb gradient (CG).

NOTE 1: Obstructions encountered that would require a CG in excess of 200 ft/NM to an altitude of 200 feet or less above the DER elevation should already be identified in the "IFR Take-Off Minimums and (Obstacle) Departure Procedures" section of FLIP. Aircrews receiving radar vectors should therefore be aware of these obstructions and take appropriate action to avoid them.

NOTE 2: A minimum crossing height over the DER may be specified to raise the 40:1 OCS origin height to reduce or eliminate the need for a CG.

3.3.14.3. Sectorize the DVA IAW AFMAN 11-226(I), Volume 4, paragraph 2.2, or isolate the obstacle(s) causing the penetrations with buffered areas IAW AFMAN 11-226(I), Volume 4, Figure 2-9. When isolating obstacles, the boundary of the buffered area shall be established 3 NM (5 NM when the obstruction is greater than 40 NM from the radar antenna) from the penetrating obstacle(s).

NOTE: At locations using the DVA obstacle isolation option when operating with a Center Radar Presentation (CENRAP), apply a 5 NM buffer area around all penetrating obstacles throughout the entire DVA.

3.3.14.4. DVA sectors and buffered areas shall be depicted on a radar video map.

3.3.14.5. Areas outside of established sectors and buffered areas within the DVA are known as "free vector areas".

3.3.14.6. An instrument procedure package is required for DVA documentation. The entire DVA (including all established sectors and any buffered areas) shall be depicted on a suitably scaled map with topographical features and maintained with other TERPS files.

NOTE 1: Provide the facility manager all required restrictions (DER crossing height) and all other information so that the DVA can be designed to eliminate vectoring through multiple sectors that require different climb gradients. Include the dimensions of the entire DVA; describe each DVA sector and/or buffered area, and any required CG. This information will also be used by the facility manager to adequately describe the DVA to ATC in a facility operating instruction.

3.3.14.7. When the MSL height of the isolated obstruction plus the appropriate Required Obstacle Clearance (ROC) height above the associated buffer area is below the MVA/MIA, the altitude (rounded to the next higher 100-foot increment) required to clear this obstacle must also be specified in the DVA guidance so that ATC will have the option of vectoring departing aircraft over the obstacle.

3.3.14.8. Turns below 400 ft above the airport elevation shall not be authorized for DVAs.

NOTE: This note pertains to DVA development when vectoring aircraft below the MVA or MIA that are departing FAA-owned satellite airports. When the USAF is the IFR controlling facility, contact the appropriate FAA procedure specialist for the results of the diverse departure assessment, to include the location, description, and elevation of all OCS penetrations. Use this information to develop the DVA per this AFI. The existence of a diverse departure assessment or publication of the Delta T symbol (T) by the FAA does not relieve the USAF of the responsibility for developing an appropriate DVA.

3.3.15. Paragraph 3.1; Dead Reckoning (DR) Departure. When operational necessity dictates, DR segments may extend more than 10 NM from DER. When applying this option, the DP is nonstandard and waiver processing IAW paragraph **5.5.** is required.

3.3.15.1. 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 departure.

3.3.15.2. Publish DR tracks, not headings, to be flown, for example, "Climb on Track XXX," not "Climb on Runway Heading".

3.3.16. Paragraph 3.3; Localizer Guidance. When PCG is provided by a localizer, the note "CAUTION: Back course procedures apply" shall be published on the planview.

3.3.17. Paragraph 3.5, Turning Segment Construction; 3.5.1, General. The minimum airspeed allowed for Category E aircraft shall be 310 KIAS.

Table 3.1. DELETED.

3.4. AF IMT 3634, Departure Procedure (DP). Use this IMT to coordinate agency approval and publish SIDs and Route DPs.

3.4.1. Item 1. **Departure.** Enter the departure name and number, as you want it to appear on published data. Name departures according to FAA Order 8260.46, Appendix 2. For FTIP departures, enter the identification verbatim, as published by the host nation.

3.4.2. Item 2. **Aerodrome/Airport Name.** Enter the name of the airport. Also include the four-letter or alphanumeric ICAO designator.

3.4.3. Item 3. **Departure Computer Code.** Coordinate with servicing FAA ARTCC on assignment and effective date of departure computer codes IAW FAA Order 8260.46.

3.4.4. Item 5A. **Type of Departure**. Indicate whether the Departure Procedure (DP) was developed to meet an Air Traffic Control requirement or for the purpose of obstacle avoidance. Also indicate if the procedure is to be published as a high, low, or both.

3.4.5. Item 5B. **Publish.** Indicate which product, FLIP or NGA Loose-leaf, is required. When a NGA loose-leaf is required, attach a distribution list and/or state whether or not a negative is required. Additionally, indicate how NGA is to publish; either as a graphic or in a text format. Refer to FAA Order 8260.46, *Departure Procedure (DP) Program,* for guidance on making this determination.

3.4.6. Item 6. **Effective Date.** Enter requested date based on operational requirements and integration into ARTCC computer system. The final review authority enters the actual effective date after coordination with all concerned agencies. Indicate if procedure is original or amended. If an amendment, type the amendment number in the block provided below the effective date.

3.4.7. Item 7. **Planview.**

3.4.7.1. Depict the airfield and prepare a graphic illustration of the complete departure routing. The chart shall encompass the area required to effectively show the departure routing, including transitions to the appropriate en route structure. This chart may be included as an attachment to the procedure package.

3.4.7.2. Only one procedure shall be shown on the form; it may have multiple transitions. Portray take-off routes from more than one runway or from opposite ends of the same runway as one procedure.

3.4.7.3. All routes, turns, altitudes, radio aids to navigation, facilities forming intersections and fixes, and those facilities terminating the departure procedure (where the procedure joins the altitude structure for which the departure was established), shall be shown in graphic illustration. Enter geographical coordinates to the nearest hundredth of a second, of each fix used in RNAV procedures. For each transition, include the name of the chart (L-1, H-5, etc.) that shows the enroute facility. Show the mileage and courses, radials, or bearings between runway(s) and facilities or fixes along the route of flight.

3.4.7.4. Normally, the depiction is centered either on the airport runways or primary NAVAID. Depictions may be offset in order to better utilize the plan view area to enhance readability. All drawings shall be oriented to true north.

3.4.7.5. In addition to the above data, include:

3.4.7.5.1. Radio Frequencies. Indicate one primary VHF and one primary UHF frequency for the functions listed and any other agency, as required.

3.4.7.5.2. Special Use Airspace (SUA). SUA shall be shown only when considered critical to the procedures as designated by requesting agency.

3.4.7.5.3. Obstacles.

3.4.7.5.3.1. Segment controlling obstacles and other prominent obstacles that would create a hazard to safe navigation in the event departure procedures were not executed precisely shall be shown in their exact geographic location so as to be in true relationship to the departure procedure. When portrayal of several obstacles in a small area would tend to create clutter, only the highest of the group need be shown.

3.4.7.5.3.2. The mean sea level (MSL) elevation of the obstacle shall be shown to the nearest foot.

3.4.7.5.4. Minimum Climb Rate.

3.4.7.5.4.1. Obstacle DP. When required for obstacles, depict a minimum climb rate in the blocks provided to the right of the frequency listing. When the climb rate required for ATC purposes is *higher* than the climb rate required for obstacles, also depict it on the obstacle DP. Do not depict ATC climb rates that are lower than the minimum (obstacle) climb rate.

3.4.7.5.4.2. SID. ATC climb rates shall be depicted in the blocks provided to the right of the frequency listing.

NOTE: Departure climb rates required for obstacle avoidance or ATC purposes do not require waiver.

3.4.7.5.4.3. Minimum and ATC climb rates shall be shown in the table as vertical velocities (V/V) in feet per minute (fpm) in 60 knot increments. See paragraph **3.3.8.3.** for additional guidance.

3.4.7.5.4.4. Where multiple runway departures are required, show the V/V information for all runways involved by drawing more blocks to extend the columns vertically down the page.

3.4.7.5.4.5. An asterisk (*) will be used to footnote Minimum Climb Rates and the dagger symbol (†) will be used to footnote ATC Climb Rates.

3.4.7.5.4.6. When the climb rate is premised on an ATC requirement, the following note will be shown immediately below the V/V box: "ATC Climb Rate." Minimum or ATC climb rates must indicate the altitude and/or fix at which the climb gradient is no longer required.

3.4.7.5.5. Notes.

3.4.7.5.5.1. Operational notes shall be held to an absolute minimum and shall be based on mandatory user requirements.

3.4.7.5.5.2. Procedural data notes shall be published to be consistent with the safe execution of the procedure.

3.4.8. Item 8. **Departure Procedure Description.** A written description of the departure procedure, including all turns, altitudes, headings, distances, facilities/fixes, and all routes (indicate route number if an airway; indicate "direct" if otherwise) to the terminating facility/fix. Add the computer code for transitions, where applicable.

NOTE: When revising Item 7 or Item 8 of previously published DPs, attach a copy of the previous version with revisions clearly indicated.

3.4.9. Item 9. **Controlling Obstacles.**

3.4.9.1. **Takeoff Obstacles.** Identify obstacles located in the ICA that require the publication of nonstandard takeoff minimums and/or a climb gradient.

NOTE: See paragraph **3.3.8.** for guidance on how to calculate climb gradients for those obstacles that cause a CG in excess of 200 ft/NM to an altitude of 200 feet or more above the DER elevation.

3.4.9.2. **Departure Obstacles.** Identify obstacles outside the ICA but within subsequent departure trapezoids that require the publication of nonstandard takeoff minimums and/or a climb gradient. In some cases where specific departure routing is required, obstacles dictating procedure design may be outside the trapezoids but shall be depicted on the DP for aircrew awareness and listed here as a departure obstacle.

3.4.10. Item 10. **Adjustment for Close-In Obstacles.** When an adjustment is required, enter the minimum height (AGL), in feet, for the aircraft to be over the departure end of runway (DER). This height shall not exceed 35 feet. Also publish this value in a note on the planview as follows: "Cross DER at least 20 feet AGL/187 MSL" or "Cross DER at least 5 feet AGL/3685 MSL due to barrier equipment".

3.4.11. Item 11. **If an Obstacle Climb Gradient is Published, List Take-Off Minima.** List the take-off minima for the benefit of applicable civil users. When the DP is noted "NOT FOR CIVIL USE", enter "N/A" once at the top of each column.

3.4.12. Item 12. **Are Expanded Service Volume Checks Required?** When a DP is developed that incorporates segments and/or fixes that reach beyond the standard service volumes listed in FAA Order 8260.19, an expanded service volume (ESV) check is required. Download, complete, and process FAA Form 6050-4 IAW paragraph **2.4.** of this AFI. Maintain approved ESVs with the DP.

3.4.13. Item 13. **Are Airspace Changes Required?** To afford separation from other aircraft, all departure procedures shall be contained in controlled airspace (see paragraph **A3.1.5.**). Related information may be found in AFI 13-201, FAA Order 7400.2, FAA Order 7400.9, and FAA Order 8260.46.

3.4.14. Item 15. **Are Waivers to Departure Criteria Required?** When applicable, check the yes box and list any waivers required for new or amended procedures. List the number of approved waivers on file for amended procedures and the approval date for each waiver. These waiver listings can be placed in Item 16, Remarks, or continued on bond paper as needed.

3.4.15. Item 16. **Remarks.** Enter other pertinent data necessary to publish an accurate departure.

NOTE: Ensure the other Item 16, Departure ID, at the top of page 3 is completed.

3.4.16. Item 17. **Approval Signatures.** All signature blocks shall be signed, as required. As a minimum, the "Procedure Specialist," "Air Traffic Operations Manager" (at locations where the USAF has development responsibility), "Senior Operational Commander," and "MAJCOM TERPS Branch" signatures shall be obtained. When the procedure's protected airspace overlaps into an adjacent facility's airspace, ensure coordination signatures are obtained from that facility. On nonstandard procedures, "MAJCOM (*WAIVER*)" block must be signed by the MAJCOM/DO or formally designated representative, as outlined in the appropriate MAJCOM supplement to AFI 11-230. Include an explanation when signatures cannot be obtained.

NOTE 1. All signature blocks shall include printed name, rank/grade, and office symbol.

NOTE 2. The "Senior Operational Commander" block for Foreign Terminal Instrument Procedures shall be signed by the MAJCOM/DO/CFACC/JFACC (or equivalent), or a formally designated representative. This will signify compliance with paragraph **1.4.3.**. At locations where the USAF has pro-

cedure development responsibility, the designated representative for the "Senior Operational Commander" is the primary Wing OG responsible for flight operations.

3.5. DELETED.

3.6. DELETED.

Chapter 4

INSTRUMENT APPROACH AND ARRIVAL CRITERIA

4.1. Standard Terminal Arrival (STAR). All STARs within the Continental US, Alaska, and Hawaii are developed and maintained by the FAA. When a requirement exists that can't be met by the FAA, develop STARs only when feeder routes and/or initial approach segments will not suffice. Use the criteria in AFMAN 11-226(I), Chapter 17, and the guidance in FAA Order 7100.9, *Standard Terminal Arrival,* when developing a STAR. Use FAA Form 7100-4, ***STAR-Standard Terminal Arrival,*** for documenting and processing the procedure. Instructions on filling out FAA Form 7100-4 can be found in FAA Order 7100.9.

NOTE: Host nation produced STARs shall be evaluated, documented, and processed IAW the applicable host nation FTIP acceptance category and guidance in **Chapter 7**.

4.2. Airborne Radar Approach (ARA) Criteria. Airborne Radar Approach procedures are special-use procedures (see paragraphs **5.8.** and **8.3.**) used only by aircraft with approved airborne radar systems. MAJCOM headquarters flying authorities review and approve these airborne radar systems for aircraft assigned to them. At a minimum, develop an intermediate, final, and missed approach segment IAW AFMAN 11-226(I) as follows:

4.2.1. **Initial Approach Segment.** Apply AFMAN 11-226(I), Volume 1, paragraphs 230, 231, 232, and 235 except the angle of intersection between the initial and intermediate approach courses will not exceed 90 degrees. A satisfactory terminal area fix (AFMAN 11-226(I), Volume 1, Chapter 2, Section 8) may be used in addition to the ARA fix at the Initial Approach Fix (IAF) to facilitate use of enroute navigation systems up to the IAF.

4.2.2. **Intermediate Approach Segment.** When there is no initial segment, the intermediate fix altitude shall not be below the MVA at the intermediate fix location. Apply AFMAN 11-226(I), Volume 1, paragraphs 240, 241, and 242.

4.2.3. **Final Approach Segment.** Comply with AFMAN 11-226(I), Volume 1, paragraph 250, except:

4.2.3.1. **Alignment.** The final approach course will be aligned on the extended runway centerline.

4.2.3.2. **Area.** The area considered for obstacle clearance begins at the final approach fix, ends at the runway threshold, and is centered on the final approach course. Course length must provide adequate distance for an aircraft to make the required descent. Minimum length is 6 miles, and maximum length is 10 miles.

4.2.3.2.1. The primary area width is 1.7 miles on each side of the runway centerline at the approach end. It expands uniformly to a maximum 4-mile width on either side of the extended runway centerline (8 miles total) at a point 10 miles from the approach end of the runway.

4.2.3.2.2. AFMAN 11-226 (I), Volume 1, paragraph 1044b, Airport Surveillance Radar (ASR) criteria can be used in developing the final approach segment for aircraft equipped with APN-241 RADAR in lieu of the criteria stated in paragraph **4.2.3.2.1.**. Since the obstacle assessment areas are smaller, aircraft must be equipped with Dual Inertial Navigation System (INS), Integrated Global Positioning System (GPS), and Dual Radar Altimeters. When this criteria is used, the following note shall be published in the approach plate: "**FOR USE BY**

AIRCRAFT EQUIPPED WITH APN-241 AIRBORNE RADAR, DUAL INS, INTEGRATED GPS, AND DUAL RADAR ALTIMETERS."

NOTE 1: MAJCOM flying operations are required to determine whether or not specific airborne ground mapping equipment supports the ability to perform ARA procedures.

NOTE 2: Integrated GPS must meet the requirements established in AFI 11-202, Volume 3 and current AF/MAJCOM policy directives. The additional systems required are to supplement and enhance situational (position) awareness and compensate for the reduced obstacle assessment area widths.

4.2.3.2.3. The secondary area, which is on each side of the primary, is zero miles wide at the approach end of the runway. It expands uniformly to a maximum of l mile on each side of the primary area, at a point 10 miles from the approach end of the runway.

4.2.3.3. **Obstacle Clearance.** The minimum obstacle clearance in the primary area is 250 feet. In the secondary area, 250 feet of obstacle clearance must be provided at the inner edge, tapering uniformly to zero at the outer edge.

4.2.3.4. **Descent Gradient.** The optimum gradient is 318 feet per mile. The maximum is 400 feet per mile. When a step-down fix is used, the descent gradient applies between the Final Approach Fix (FAF) and the step-down fix and between the step-down fix and the runway threshold.

4.2.4. **Circling Approach.** Apply AFMAN 11-226(I), Volume 1, Chapter 2, Section 6.

4.2.5. **Missed Approach Segment.** Apply AFMAN 11-226(I), Volume 1, Chapter 2, Section 7. The missed approach point is on the final approach course at the point where the aircraft has reached a specific radar distance from the end of the runway. It must not be farther from the FAF than the first usable portion of the landing surface. Whenever possible, develop a missed approach that does not require airborne radar.

4.2.6. **Landing Minima.** Apply AFMAN 11-226(I), Volume 1, Chapter 3.

4.2.7. **ARA Reflectors.** Reflector requirements are determined by equipment specifications addressed in MAJCOM flying directives. When radar reflectors are placed on the airfield, their locations shall be depicted on the associated airport diagram.

4.2.8. **Satisfactory Fixes** . All fixes must be defined by use of the airborne radar system. The fix error used in the design of the procedure will be based on the type of airborne equipment to be used as follows:

4.2.8.1. A fix error displacement of plus or minus 500 feet may be used and the following note shall be published on the Approach Procedure: "PROCEDURE NOT AUTHORIZED FOR APN-59 EQUIPPED AIRCRAFT."

4.2.8.2. When a procedure must be designed to accommodate APN-59 equipped aircraft, a fix error displacement of plus or minus ¾ NM must be used.

4.2.8.3. Annotate all **named** turn points and fixes of an airborne radar pattern as waypoints (see paragraph **2.3.**). Process the appropriate FAA Form 8260-2. RNAV waypoints may be depicted for all segments but they **shall not** be used as a primary means of navigation.

NOTE: RNAV waypoints must be included on an ARA procedure to assist aircrews in maintaining situational awareness when airborne vectors become unreliable due to radar equipment malfunctions or other limitations (aircrew proficiency, airfield reflectivity, etc.).

4.3. Area Navigation (RNAV).

4.3.1. RNAV (ground-based systems, e.g. VOR/DME). Manually develop procedures using the criteria in AFMAN 11-226(I), Vol. 1, Chapter 15.

4.3.2. RNAV (satellite-based systems, e.g. GPS).

4.3.2.1. Non-precision (stand-alone LNAV IAW FAA Order 8260.38 and Terminal Arrival Areas (TAA) IAW FAA Order 8260.45). Use GPD to develop all supported procedure segments, to include final, intermediate, initial, holding, right/left base, straight-in, ESA, and MSA. Construct missed approaches manually. Include in the procedure package all drawings and manual computations.

4.3.2.2. The USAF takes exception to FAA Order 8260.38, paragraphs 11a and 12a. For USAF procedures, course changes at the Intermediate Waypoint (IWP) shall not exceed 90 degrees. Course changes at the Final Approach Waypoint (FAWP) shall not exceed 15 degrees.

4.3.2.3. Approach with Vertical Guidance (APV), LNAV/VNAV (including Baro-VNAV), and LPV. RESERVED.

4.3.2.4. RNAV departures. RESERVED.

4.4. Point in Space (PINS) Procedures. Procedures that do not provide for landing may be established with a Minimum Descent Altitude (MDA) or Decision Altitude (DA) of 500 feet or higher above ground level (AGL). Except for helicopter point in space procedures, these are special-use procedures and require annotation per paragraph **5.8.**. Additionally, paragraph **2.7.**, Visual Flight Rules (VFR) Procedures, applies to PINS procedures.

4.5. Publishing ILS Restrictions. Permanent, flight inspected restrictions to ILS facilities, as documented in the flight inspection report, shall be published in the plan view of FLIP as a caution note(s). Inform all other signatories on the procedure of these restrictions. Examples: "CAUTION: ILS GS unusable below 300 MSL", or "CAUTION: Autopilot coupled operations NA past DA". Any new restrictions shall be processed as procedural changes.

4.6. Combining Procedures. The primary reason for combining instrument approach procedures is to facilitate pilot actions when flying multi-receiver aircraft. Procedures must first be developed as stand-alone procedures and then may be combined on a single chart provided all of the following:

4.6.1. Aircrew confusion or chart clutter does not result.

4.6.2. The differences in the published final approach courses span no more than 4 degrees of each other and only one track is depicted. Show no more than two final approach courses. Example: ILS 151°/TAC 154°.

4.6.3. Only one FAF/PFAF and altitude, step-down fix (most restrictive) and altitude, VDP, and non-precision missed approach point (MAP) is established.

4.6.4. Circling minima are common.

4.6.5. Missed approach procedures are common; except that the precision and non-precision missed approach points may differ. However, the procedures *may not be combined* if the missed approach evaluations produce different results (for example; the localizer missed approach surface has no penetrations but the ILS requires a climb gradient).

NOTE 1: Reference an ILS approach, a minimum of two separate builds, one for the ILS and one for the LOC, must be in the instrument procedure package. Segments common to both the ILS and the LOC (initial segment, ESA, MSA) need only be developed and documented once.

NOTE 2: RNAV (GPS) procedures shall not be combined with procedures using ground based NAVAIDs (e.g., VOR/DME, TACAN, ILS, etc.).

4.7. Displaced Threshold Procedures. Temporarily displacing or moving the threshold may have an adverse effect on instrument approach/departure procedures. TERPS personnel shall revise instrument procedures as necessary to ensure flight safety and as required to support continued flying operations. Only those procedures considered mission essential will be adjusted based on the following guidance:

4.7.1. For procedures developed using GPD, edit the runway information (using the Data Manager application) to indicate the amount of threshold displacement. A new, displaced threshold location is automatically calculated. Ensure that the runway landing length is also changed to reflect the shortened runway. In the runway supplementary data, indicate that the displacement is temporary. Ensure that the displaced threshold elevation and the new TDZE is also entered. If the highest portion of the aerodrome was at the non-displaced threshold, the airport elevation may also require update in the aerodrome properties. After saving and exiting Data Manager, run Auto Eval on all saved procedures to check for changes.

4.7.2. Analyze the Auto Eval results, and refresh all procedures that indicate changes and that are intended for continued use during the temporary threshold displacement. Note all violations, and correct if possible. Process all procedural changes per guidance in this instruction.

4.7.3. Note that precision operations may not be possible during temporary threshold displacements (N/A to associated non-precision procedures, i.e. localizer). When re-evaluation results in a GQS penetrations, lower than standard TCH/WCH, and/or an RPI at or prior to the displaced threshold location, existing precision procedures must be NOTAMed unusable.

4.7.4. When appropriate, add temporary obstacles for any equipment that will be located on or around the runway.

4.7.5. Visual glideslope indicator systems (VASI/PAPI/PLASI) may be unavailable for the same reason as the ILS (see paragraph **4.7.3.**).

NOTE: The intent of this paragraph is for those situations when the threshold will be temporarily displaced and operations will continue to the affected runway (i.e., normal runway operations will not be suspended by NOTAM).

4.8. Side-Step Maneuver (SSM) Procedures. A SSM is a procedure where the non-precision final approach is aligned to one runway (referred to as the approach runway), and a visual maneuver is made to land on an adjacent or parallel runway (referred to as the side-step runway). Do not apply SSM criteria to precision approach procedures. A SSM to an adjacent or parallel runway is authorized under the following conditions:

4.8.1. Runway centerlines are separated by 1200 feet or less.

4.8.2. Only one non-precision final approach course (to the approach runway) is published.

4.8.3. Approach runway final approach course shall meet straight-in alignment criteria and be aligned within 3 degrees of the approach runway centerline.

4.8.4. The procedure is identified according to AFMAN 11-226(I), Volume 1, paragraph 161.

4.8.5. Evaluate a non-precision final approach segment (appropriate to the final approach guidance) for both the approach and side-step runways.

4.8.5.1. The appropriate final approach area of the side-step runway must be aligned with runway centerline extended.

4.8.5.2. Establish the side-step runway 'FAF' on the final approach course abeam the approach runway FAF. The area considered for obstacle clearance in the side-step final starts at the side-step 'FAF' and continues towards the side-step runway threshold.

4.8.5.3. Evaluate a standard visual portion of final to both the approach and side-step runways. Do not establish a VDP for the side-step runway.

4.8.5.4. Determine the MDA for both final approach areas.

4.8.6. The same non-precision obstacle clearance used for the approach runway shall be used to determine the non-precision MDA for the side-step runway. The published side-step MDA shall be the higher of the MDAs determined for either the approach or side-step final approach areas.

4.8.7. Visibility Minima.

4.8.7.1. Publish visibility IAW AFMAN 11-226(I), Volume 1, Table 6, or Table 11, whichever is greater. Use the side-step height above touchdown (HAT) when calculating visibility values (side-step runway MDA minus side-step runway Touchdown Zone Elevation (TDZE) equals side-step runway HAT).

4.8.7.2. When the distance between the FAF and side-step runway threshold is less than the minimum no-lights visibility, a SSM for that approach category is not authorized.

NOTE: This is because the maneuver can only be conducted between the FAF and the MAP and sufficient visibility is necessary to acquire and maneuver to the side-step runway.

4.8.7.3. Published visibilities must not be less than the distance between the MAP and the side-step runway threshold measured from the plotted position of the MAP directly to the side-step runway threshold.

4.8.7.4. Credit for lights installed to the side-step runway may be applied according to AFMAN 11-226(I), Volume 1, Chapter 3, except read references to straight-in as side-step. The minimum visibility after applying credit for lights must be no less than 1 mile.

4.8.8. Apply criteria for descent gradients in AFMAN 11-226(I), Volume 1, paragraph 252, to the approach runway. Also apply paragraph 252 to the side-step runway except the gradient is based on:

4.8.8.1. The distance from the FAF or the last step-down fix to the side-step runway threshold.

4.8.8.2. The height difference between the minimum altitude at the FAF or the last step-down fix and the TDZE of the side-step runway.

4.8.9. Minima are published as shown in the sample below in **Figure 4.1.**. Assuming runways 27L and 27R, with a TACAN approach published to runway 27L, and the procedure would be identified as TACAN RWY 27L.

NOTE: When publishing circling minima, the Circling Minimum Descent Altitude (CMDA) in each category shall not be lower than the highest published non-precision side-step runway MDA.

Figure 4.1. Sample Side-Step Minima Publication.

CATEGORY	A	B	C	D
S-27L	**400/24** 390 (400-1/2)		**400/40** 390 (400-3/4)	
SIDESTEP RWY 27R	**500/24** 490 (500-1/2)		**500/40** 490 (500-3/4)	
CIRCLING	**500-1** 486 (500-1)		**500-1¾** 486 (500-1¾)	**580-2** 566 (600-2)

4.9. Airport Surveillance Radar (ASR) Approach Procedures. Apply AFMAN 11-226(I), Volume 1, paragraph 252 when determining the appropriate ASR approach descent gradient and FAF altitude. The TCH, descent angle, and gradient shall not be published for ASR approach procedures.

4.9.1. At Radar Final Control (RFC) locations without ASR scope availability, surveillance approaches using PAR azimuth may be developed using Localizer criteria (AFMAN 11-226(I), Volume 1, Chapter 9). This will permit use of USAF GPD for procedure development. Recommended altitudes must be computed manually.

4.9.1.1. The FAF is defined as a distance from the PAR touchdown point (RPI).

4.9.1.2. The segment length shall be measured from the FAF to the PAR touchdown point (RPI).

4.9.1.3. Recommended altitudes shall be figured for each mile on final, but not below the MDA.

4.9.1.4. Use the FAF to threshold distance and the TCH (MSL value) when calculating the recommended altitudes for straight-in approaches.

NOTE: Use the VGSI TCH for calculations. When there is no VGSI for the runway, select an appropriate TCH from AFMAN 11-226(I), Volume 3, Table 2-3.

4.9.1.5. Recommended Altitude Calculations. Recommended altitudes shall be rounded to the **nearest** 20-foot increment. Given the following conditions: FAF 7.8 miles from threshold; minimum altitude at FAF is 9000; minimum altitude at 3 mile fix is 7300; TCH Elevation (MSL) is 6172; and MDA is 6600, use the following to calculate the recommended altitudes.

Table 4.1. Sample Recommended Altitude Calculations.

9000 – 7300= 1700 divided by 4.8 = 354 ft/NM from FAF to step-down fix

(0.80 X 354 = 283 ft/NM FAF to 7 Miles)

7300 – 6172 divided by 3 = 376 ft/NM from step-down fix to threshold

NOTE: Since the gradient between the step-down fix and the threshold is greater than the gradient between the FAF and the step-down fix, the greater gradient must be continued out to the FAF and the minimum altitude at the FAF must be adjusted upward.

4.8 X 376 = 1804.8

7300 + 1804.8 = 9104.8 = ***9100*** *(Adjusted FAF altitude)*

(0.80 X 376 = 300 ft/NM FAF to 7 miles)

9100 – 300 = 8800 at 7 miles **8800**

8800 – 376 = 8424 at 6 miles **8420**

8424 – 376 = 8048 at 5 miles **8040**

8048 – 376 = 7672 at 4 miles **7680**

7672 – 376 = 7296 at 3 miles **7300** (Step-down Fix)

7300 – 376 = 6924 at 2 miles **6920**

6924 – 376 = 6548 at 1 mile **Not Used (**Below MDA**)**

4.9.2. For point in space approaches, the recommended altitudes must also be calculated manually as described above, except use the FAF to MAP distance and the MDA.

4.10. DELETED.

4.11. Best Fit Straight Line (BFSL) Application to Threshold Crossing Height (TCH).

4.11.1. When the TCH has been determined by actual flight inspection IAW FAA Order 8240.47, *Determination of Instrument Landing Systems (ILS) Glidepath Angle, Reference Datum Heights (RDH), and Ground Point of Intercept (GPI),* enter the RDH value from the flight inspection report as supplementary ILS data.

4.11.2. ILS procedures that have a TCH determined by BFSL that is below 30 feet or above 60 feet shall be submitted for waiver approval. A copy of the Flight Check report shall be submitted with the waiver request. GPD will not automatically raise a violation or generate a waiver form.

4.11.3. Apply FAA Order 8240.36, *Instructions for Flight Inspection Reporting,* Appendix 22, when completing FAA Form 8240-22, Facility Data.

4.12. AF IMT 3637, Instrument Approach Procedures. Complete this IMT manually when documenting USAF instrument approach procedures not automated by GPD. It provides a permanent record of data available at the time of original/amended procedural development. Complete all blocks on the IMT. Enter "NA" where data is not authorized/applicable. Attach computation forms (manual or automated), as applicable.

4.12.1. Item 1. **Name of Airfield.** Enter the name of the airport. Also include the four-letter or alphanumeric ICAO designator.

4.12.2. Item 3. **Procedure Identification.** Enter the procedure identification according to AFMAN 11-226(I), Volume 1, Chapter 1, Section 6. When amending a procedure, enter the amendment number after the procedure ID. Amendments to procedures will be numbered sequentially beginning with "1"

and are required for all procedural changes to the IAP (see paragraph 6.2.). Amendment changes are not required for editorial corrections (AFMAN 11-226(I), Volume 1, paragraph 142). For Foreign Terminal Instrument Procedures, enter the identification verbatim, as published by the host nation.

4.12.3. Item 4. **Aerodrome Reference Point.** Enter coordinates in WGS 84 (when available) to the nearest hundredth of a second. When WGS 84 data is not available, state the datum used to express this point. This point should be the location used to determine actual magnetic and grid variations.

4.12.4. Item 5. **Effective Date.** The final review authority will enter, or instruct the requesting unit to enter, the effective date after coordinating the actual publication date with the National Geospatial-Intelligence Agency (NGA). Units should coordinate with all affected air traffic control agencies for interfacing with publication cycles and integration into the ARTCC computer system. Indicate whether the procedure is an original or an amendment.

4.12.5. Item 6. **Radio Frequencies.** Indicate one primary VHF and one primary UHF frequency for the functions listed and any other agency, as required.

4.12.6. Item 7. **Plan View.**

4.12.6.1. **Radar Procedures.**

4.12.6.1.1. Depict radar arrival routes from the Intermediate Fix (IF) to the Missed Approach Point (MAP), when Minimum Vectoring Altitude (MVA)/diverse vectors are used for the initial segment. Depict all radar arrival routes to the pre-established pattern when a specific radar pattern is used for the initial segment.

4.12.6.1.2. Depict IF, FAF, MAP, step-down fix(es) and other fixes, as applicable.

4.12.6.2. **Non-Radar Procedures.**

4.12.6.2.1. **Facilities/Fixes and Waypoints.** Depict the name, type, frequency or channel number, identification, emission (as required), and coordinates, to the nearest hundredth of a second, of each facility, fix, or waypoint, as appropriate, used in the procedure. Intersection and DME fixes used in the procedure should show the name and how formed. Show bearings and distances to facilities or fixes to the nearest degree and mile.

4.12.6.2.2. **Transition Altitude (TA) and Transition Level (TLv).** Depict the TA and TLv on procedures as established by national authorities. This information is needed primarily in overseas areas. Additional information can be found in FLIP General Planning.

4.12.6.2.3. **Holding Patterns.** Depict holding patterns to include holding fix, inbound and outbound courses, direction of turn, and leg lengths. Depict DME values at the end of each holding pattern. When leg lengths are defined by time and are nonstandard, indicate the nonstandard time positioned within the holding pattern symbol. **Publish the maximum holding airspeed when the holding pattern was designed for less than 310 knots** (e.g., "Max holding 265 KIAS").

4.12.6.2.4. **Feeder Routes.** Develop and/or depict routes frequently used by ATC and local aircrews. The operational service volume of and any known restriction to each NAVAID used should be considered prior to establishing feeder routes.

4.12.6.2.4.1. **High Altitude IAP Outer Ring.** Depict facilities or fixes which are part of the enroute high altitude airway structure as published on the enroute high altitude chart to include routing, distance, and MEA to the IAF, holding fix, or feeder facility.

4.12.6.2.4.2. **High Altitude IAP Middle Ring.** Depict facilities or fixes that are not part of the enroute high altitude airway structure. Facilities that are part of the enroute low altitude airway structure and used for transition from high to low or to eliminate ESV problems should be shown on this ring. Facilities or fixes on this ring must have a transition from a facility or fix on the outer ring. Include routing, distance, and MEA to the IAF or holding fix. Facilities on this ring must include the name, frequency/channel number, as appropriate, and identification. The depiction of these fixes must show how they are formed.

4.12.6.2.5. **IAP Depiction.**

4.12.6.2.5.1. All items depicted within the inner ring should be drawn to scale. Range radius is 10 NM for low altitude IAPs and 20 NM for high altitude IAPs. Recommend scales for the inner ring designed on engineer ruler 60 scale: 10 ticks = 1 NM for low altitude IAPs and 5 ticks = 1 NM for high altitude IAPs. Center the IAP drawing on the NAVAID that provides final approach guidance. Depictions may be offset in order to make better use of the planview area. Orient the IAP depiction to true north.

4.12.6.2.5.2. Include the following items: IAF(s)/IAWP(s), IF/IWP, FAF/FAWP, stepdown/ATD fixes, MAP/MAWP, and other fixes/waypoints, as applicable.

NOTE: "FAF-only" instrument procedures shall not be developed. At a minimum, an intermediate or holding segment must be depicted joining the final approach segment.

4.12.6.2.5.3. Depict the routing of all IAP segments to include headings, radials, bearings, arcs, course, procedure turn (PT), or holding pattern in lieu of PT.

4.12.6.2.5.4. Depict each controlling obstruction within a 10 NM radius (low altitude) and a 20 NM radius (high altitude) which fall within the initial, intermediate, final, circling, and missed approach areas. Other significant obstacles in or near these areas may be charted within the inner ring when deemed critical to flight safety. Explain obstacles located near the final approach area edge, excessively high terrain that parallels the final approach area edge and/or the intermediate boundary areas, etc., in a note. When portrayal of several obstructions within a small area would clutter the chart, only the highest obstacle of that group need be shown. The MSL elevation of the obstacle shall be indicated to the nearest foot.

4.12.6.2.5.5. Use symbols listed in the "LEGEND INSTRUMENT APPROACH PROCEDURES (CHARTS)" section of the DoD FLIP. Symbol drawings do not need to be to scale; however, they should adequately portray required information to publication agencies.

4.12.6.2.5.6. Depict hydrographic features, international boundaries, and/or special use airspace (SUA), as applicable.

4.12.7. Item 8. **Minimum Safe/Sector Altitude (MSA).** When sectorizing the MSA, depict the sectors clockwise between magnetic bearings toward the NAVAID. Depict the MSA as shown in the "LEGEND INSTRUMENT APPROACH PROCEDURES (CHARTS)" section of the DoD FLIP.

4.12.8. Item 9. **Vertical Velocity (V/V) Chart.** Missed approach climb gradients in excess of 200 ft/NM are nonstandard, require waiver action, and shall be published as vertical velocities in feet per minute (FPM). Publish these climb gradients in 60-knot increments from 60 knots to 300 knots (low IAPs), 120 knots to 360 knots (high IAPs), or as requested (see paragraph **3.3.8.3.**). Publish the termination altitude of the missed approach climb gradient in a note just above the V/V chart. Use the following format: "CAUTION: Missed Approach Minimum Climb Rate to (altitude)".

4.12.9. Item 10. **Field Elevation.** Enter the elevation of the highest point on the usable landing surface.

4.12.10. Item 11. **Touchdown Zone Elevation.** Enter the elevation of the highest point in the first 3000 feet of the approach end of the runway rounded to the nearest whole foot.

4.12.11. Item 12. **Profile.**

4.12.11.1. **Radar Procedures.**

4.12.11.1.1. Depict radar arrival routes from the Intermediate Fix (IF) to the Missed Approach Point (MAP), when Minimum Vectoring Altitude (MVA)/diverse vectors are used for the initial segment. Depict all radar arrival routes to the pre-established pattern when a specific radar pattern is used for the initial segment. Include headings, radials, bearings, arcs, and courses.

4.12.11.1.2. Depict IAF/IF when a specific radar pattern is used. Depict FAF, MAP, stepdown fixes, or other fixes, as applicable, with associated altitude information as shown in the "LEGEND INSTRUMENT APPROACH PROCEDURES (CHARTS)" section of the DoD FLIP.

NOTE: At a minimum, an intermediate segment must be depicted joining the final approach segment.

4.12.11.1.3. Indicate glidepath angle and threshold crossing height (TCH) on PAR procedures.

4.12.11.1.4. Depict ASR recommended altitudes and distances across the top portion of the profile. Compute altitude information according to **Table 4.1.** of this AFI.

4.12.11.1.5. Indicate FAF to MAP and MAP to runway distances as shown on FLIP IAP charts.

4.12.11.1.6. Missed approach instructions are not required in the profile section.

4.12.11.2. **Non-Radar Procedures** .

4.12.11.2.1. Include the following items: IAF(s), IF, FAF, stepdown fixes, MAP, and other fixes, as applicable. Depict the routing of all IAP segments to include headings, radials, bearings, arcs, course, procedure turn (PT), or holding pattern in lieu of PT.

NOTE: "FAF-only" instrument procedures shall not be developed. At a minimum, an intermediate or holding segment must be depicted joining the final approach segment.

4.12.11.2.2. Include associated altitude information with fixes listed in paragraph **4.12.11.2.1.**.

4.12.11.2.3. Enter the Visual Descent Point (VDP) DME value.

4.12.11.2.4. Indicate glidepath angle (GPA), TCH, glidepath intercept altitude, and height of the glidepath at the localizer FAF on ILS procedures. Indicate the radio altimeter (RA) height at the DA point on CAT II ILS procedures.

4.12.11.2.5. Indicate the Vertical Path Angle (VPA) or descent angle and TCH on non-precision procedures.

NOTE: When the published descent angle and VGSI angle are not coincident, publish the following note: "VGSI and descent angles not coincident."

4.12.11.2.6. Indicate FAF to MAP and MAP to runway distances as shown on FLIP IAP charts. Indicate distance between the DA point and runway threshold in feet on CAT II ILS procedures.

4.12.11.2.7. Missed approach instructions are not required in the profile section except when the IMT is used as the sole support for exercise or actual contingency operations.

4.12.11.2.8. Transition Altitude (TA) and Transition Level (TLv). Depict the TA and TLv on procedures as established by national authorities. This information is needed primarily in overseas areas. Publish transition altitude(s) to the nearest 100 feet and flight levels as specified. Additional information can be found in FLIP General Planning.

4.12.11.2.9. Airport Sketch. Include this drawing only when the AF IMT 3637 is used for exercises or contingency operations. Drawing need not be to scale. Draw the runway and depict its length and width as shown on FLIP IAP charts. Indicate approach lighting identification, Visual Glideslope Indicator (VGSI), and runway lighting as shown on FLIP IAP charts and according to AFMAN 11-226(I), Volume 1, Appendix 5.

4.12.12. Item 13. **Minimums.**

4.12.12.1. Enter procedure name i.e., ILS-36; LOC-36; TAC-36; CIRCLING; etc., under "CAT/APP".

4.12.12.2. Enter MDA or DA, as appropriate; RVR (when not available, enter prevailing visibility); HAT or HAA; and ceiling and visibility for each category. Categories may be combined when none of the minima elements differ. Enter "NA" where minima are not authorized/applicable.

4.12.13. Item 14. **MAG/GRID Variation (Actual).**

4.12.13.1. **Magnetic Variation (MV).** Enter the airport MV of Record and the associated Epoch Year value as currently assigned by the Aviation Systems Standards (AVN) office of the FAA. (Example: 8°W/2005). The MV of Record and the assigned variation used to orient the NAVAID during the commissioning flight inspection or subsequent periodic inspections may be different. Projected MV and the MV of Record should also be available from the supporting MAJCOM.

4.12.13.2. **Grivation (GV).** Grivation is the difference between the directions of the magnetic lines of force and Grid North. GV is similar to variation and used to convert magnetic headings to grid headings and vice versa. When the location is north of latitude 67° N or south of latitude 67° S, enter the GV to the nearest degree.

NOTE: AFPAM 11-216, Chapter 14, explains grid navigation and contains formulas for computing GV.

4.12.14. Item 15. **MAG/GRID Variation (Slave).**

4.12.14.1. Enter the current assigned variation for the NAVAID providing final approach course (FAC) guidance as obtained from the Aviation Systems Standards (AVN) office of the FAA. This information should also be available from the supporting MAJCOM.

4.12.14.2. Enter the current MV assigned to the ASR system for ASR approach procedures. This information can be obtained from maintenance personnel by direct reading of equipment or from the ATCALS evaluation report.

4.12.15. Item 16. **Time/Distance Table.** Enter minutes and seconds in the table based on FAF to MAP distance displayed in the profile section. Compute data as follows: (Distance X 60) divided by Knots = Minutes and Decimal minute. Decimal minute X 60 = seconds.

NOTE 1: Timing is required when the final approach does not terminate at a published fix, as is usually the case with VOR, NDB, and localizer approach procedures.

NOTE 2: Use of the middle marker as the sole means of identifying the MAP is not authorized. The middle marker may assist aircrews in identifying the MAP on certain localizer approaches provided it is coincident with the published localizer MAP.

4.12.16. Item 17. **Precision Data.** Enter runway number, GPI, RPI, TCH, and GS angle for precision approaches. Enter VGSI RRP for all procedures.

NOTE: For TCH determination, see AFMAN 11-226(I), Volume 3. Enter TCH information to the nearest hundredth of a foot and publish to the nearest foot.

4.12.17. Item 18. **Approach Information.** Enter the bearing and distance from the FAF to the MAP. Enter the missed approach instructions describing the missed approach in detail (include missed approach track, altitude, holding and other instructions, as applicable). When the MAP is based on time and distance, enter the FAF to MAP times in Item 16. When a missed approach climb gradient is required, enter the associated vertical velocity (V/V) in Item 9.

4.12.18. Item 19. **Approach/Missed Radials.** List the radials for the initial, intermediate, final and missed approach selected for flight inspection of the IAP.

NOTE: Publish the radial to the nearest whole degree (i.e., 0.49 degrees or less round down, 0.50 degrees or greater round up).

4.12.19. Item 20. **Additional Information.**

4.12.19.1. Item 20. The ESV block serves as a reminder to request expanded service volume checks when required (see paragraph **2.4.**). ESV checks apply to distance and altitude. In addition to terminal NAVAIDs, the ESV check may be required for feeder facilities. NAVAID classifications and service volume of each are listed in FLIP. Enter either "N/A" or "See attached FAA Form 6050-4".

4.12.19.2. Airspace requirements are according to AFI 13-201.

4.12.20. Item 21. **Waivers.** List all waivers required for new or amended procedures. List the Control Number assigned by HQ AFFSA to each approved waiver on file for amended procedures and the approval date for each.

4.12.21. Item 22. **Airfield/NAVAID Data.** Enter the coordinates for the approach end and departure end of the runway documented in Item 17. Enter the coordinates for the primary NAVAID providing final approach course guidance. Enter coordinates for the secondary NAVAID (GS antenna or other), as appropriate.

4.12.22. Item 23. **Obstacle Data.** List obstacle data as follows:

4.12.22.1. **Segment.** Initial, intermediate, final, missed approach, circling. Identify all stepdown fixes used. Stepdown fixes in the final segment will be listed as "FINAL (FAF - Stepdown Fix)" on one line followed on the next line with "FINAL (Stepdown Fix - MAP)".

4.12.22.2. **Controlling Obs No/Description.** Describe the controlling obstacle (terrain + trees, tower, etc.). Do not include any 'number ('No').

4.12.22.3. **Elevation and Coordinates.** Enter MSL elevation of obstacle to the nearest foot. Enter location of obstacles by latitude and longitude to the nearest second. Indicate source of information above coordinates (JOG NM 14-2).

4.12.23. Item 24. **Holding Data.** Document the data used to develop each holding pattern. When the procedure includes more than 3 holding patterns, include the data for the additional holding patterns in Item 31, Remarks.

4.12.23.1. Item 24.A. Enter the NAVAID name and 3-letter identification.

4.12.23.2. Item 24.B. Enter the radial or bearing and DME, as applicable, of the holding fix. When DME for the holding fix is not derived from the holding NAVAID or a co-located source, identify the source.

4.12.23.3. Item 24.C. List the holding template number used based on the maximum holding altitude used by ATC. Document the turn direction as "RT" for right turns and "LT" for left turns. Example: #8/LT.

4.12.23.4. Item 24.D. List the maximum holding altitude allowed for aircraft holding in this pattern.

4.12.23.5. Item 24.E. Indicate the maximum airspeed (A/S) allowed for aircraft holding in this pattern.

4.12.23.6. Item 24.G. Enter controlling obstacle latitude and longitude to the nearest second.

4.12.23.7. Item 24.H. Indicate minimum holding altitude. List ROC value when other than 1000 feet.

4.12.24. Item 25. **Minimum Sector Altitude.** Define sector(s) clockwise between bearings to the NAVAID. Documentation here should agree with the MSA depiction in Item 8. Enter the MSA minimum altitude (obstacle MSL height plus 1000 feet ROC rounded to the next higher 100-foot increment) in the 'MSA' column. NGA will verify this data.

4.12.25. Item 26. **Emergency Safe Altitude.** Emergency Safe Altitude (ESA) is approved by MAJCOM.

4.12.26. Item 27. **Feeder Routes.** List the feeder routing required by procedure. When minimum reception altitude (MRA) is required, document rationale in remarks.

4.12.27. Item 28. **Visual Aids.** Enter the type ***and*** length of approach lights used to reduce visibility minima. Enter the type ***and*** spacing of runway lights used to determine RVR minima values. Indicate yes or no, as appropriate, when touchdown zone and centerline lighting are or are not available. Enter VGSI GS angle.

4.12.28. Item 29. **No-Light Visibility.** Enter the no-light visibility values. When a credit for lights was taken in accordance with AFMAN 11-226(I), Volume 1, Chapter 3, a note shall be published on the approach plate/Radar minima section, indicating the increase that has been added to published

minimums, segregated by approach categories when different. Example: "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 1¾ miles".

4.12.29. Item 30. **ASR Recommended Altitudes.** Enter the recommended altitudes for surveillance approaches. Compute recommended altitudes according to **Table 4.1.** of this AFI.

4.12.30. Item 31. **Remarks.** The remarks section is used to expand or explain any items on the IMT. Explanations should be concise and identify specific affected items on this IMT or a specific paragraph reference in regulations pertaining to IAP criteria. Use bond paper to continue remarks and attach it to the IMT.

4.12.30.1. Publish descent information for all nonprecision approach procedures (except ASR) by entering the descent angle and TCH data from the FAF and/or last stepdown fix location to the threshold of the landing runway. When multiple stepdown fixes are published, publish the descent gradient from the last stepdown fix (the stepdown fix closest to the runway threshold) to the threshold of the landing runway. Use the following format: "(FAF or S/D fix) to (FEP): (angle/TCH)"; e.g., "Publish descent angle and & TCH as follows: LEXXY to RW19L: 3.00/59." Do not use degree (°) or feet (') symbols.

NOTE: Publishing the descent angle on nonprecision approach procedures is required but informational only. There is no instrument in the aircraft that provides deviation from descent angle information. Aircraft are authorized descent to the MDA at their discretion.

4.12.30.2. Document the ALS inop note, verbatim, here, when applicable.

4.12.31. Item 32. **Procedure Requester(s).** Enter the agency (unit/office symbol) and date of the request for IAP development. This information will be used by MAJCOM TERPS Branch to maintain IAP OPR listing.

4.12.32. Item 34. **Approval Signatures**.

4.12.32.1. Items 34a-b. Obtain the signature(s) of the flyability check and/or flight inspection pilot, as applicable.

NOTE: When the IAP was developed using NAVAIDs not maintained or flight inspected by a US agency (e.g., host nation NAVAID), enter a statement in the flight inspection pilot block to denote the agency (or country) performing the flight inspection of the facility and, when available, the date of the last inspection. Ensure any flight inspected and/or reported restrictions to the NAVAID are accounted for when developing the procedure.

4.12.32.2. Item 34c. **Approving Authority Signatures**. All signature blocks shall be signed, as required. At a minimum, the "Procedure Specialist," "Air Traffic Operations Manager" (at locations where the USAF has development responsibility), "Senior Operational Commander," and "MAJCOM TERPS Branch" signatures shall be obtained. When the procedure's protected airspace overlaps into adjacent ATC airspace, ensure coordination signatures are obtained from that facility. The "MAJCOM (WAIVER)" block must be signed by the MAJCOM/DO or formally designated representative, as outlined in MAJCOM Supplement to AFI 11-230. Include an explanation when signatures cannot be obtained.

NOTE 1: Signature blocks shall include printed name, rank/grade, and office symbol.

NOTE 2: The "Senior Operational Commander" block for Foreign Terminal Instrument Procedures shall be signed by the MAJCOM/DO or formally designated representative and signifies

compliance with paragraph **1.4.3.**. At locations where the USAF has procedure development responsibilities, the Senior Operational Commander's designated representative is the primary Wing Director of Operations (DO) responsible for flight operations.

4.13. Precision Computations. Precision computations will be accomplished manually (or augmented using self-calculating spreadsheets) when documenting precision instrument approach procedures not automated by GPD. All calculations, distance measurements, and associated drawings shall be a part of the procedure package.

4.14. AF IMT 3640, Nonprecision Computations. Complete this IMT manually when documenting USAF instrument approach procedures not automated by GPD.

4.14.1. Item 1. **MDA Based on Final Approach Segment.** Space is available to compute two types of approaches when a combined approach is being designed. The calculations are self-explanatory. Use the ROC value given in the proper chapter in AFMAN 11-226(I) for the type of approach.

4.14.2. Item 2. **MDA Based on Missed Approach.** The published MDA must also provide clearance over obstacles in the missed approach area. The calculations are self-explanatory. Due to separate obstacle areas evaluated for each category of aircraft making a turning missed approach, different MDA values could be calculated for each category. In this case, make the computations shown in Item 2 for each applicable category and enter the associated obstacle data in the remarks area of Item 10. When an obstacle penetrates the obstacle clearance surface (OCS), the MDA must be increased or a climb gradient provided. When a combination straight and turning missed approach is required or desired, refer to AFMAN 11-226(I).

4.14.3. Item 4. **Missed Approach Climb Gradient if Penetration Still Exists.** Do not use this section to compute missed approach climb gradients. See paragraph **A4.10.** for more guidance.

4.14.4. Item 8. **Visibility With Approach Lights.** Visibility may be reduced when approach lights are available and the operational conditions in AFMAN 11-226(I) are met. Use the format on the IMT to determine visibility with approach lights. Enter the associated RVR value (if any) for each aircraft category.

4.14.5. Item 9. **Published Minima.** Enter the controlling values from Items 1 through 8. Show these values in the FLIP minimum section format. When a Foreign Terminal Instrument Procedure is being validated, show the host minima here. Minima may be combined for categories when no differences exist. The highest minima (AFMAN 11-226(I)/AATCP-1(B)/host nation) shall be entered in the minima section of AF IMT 3637.

4.14.6. Item 10. **Changes in Published Visibility Minima Without Approach Lights.**

4.14.6.1. Enter only the changes that will be made to establish no-light minima.

4.14.6.2. Remarks. This section is used to expand or explain any item(s) on the IMT. It may be continued on plain bond paper, when required. Explanations/Calculations should be concise and identify specific items or a specific paragraph reference in a regulation pertaining to data herein.

4.15. AF IMT 3641, Visual Portion of Final Worksheet. Complete this IMT manually when documenting USAF instrument approach procedures not automated by GPD to evaluate the visual portion of final for runways with or without Visual Glide Slope Indicator. When multiple minimums are published, enter the lowest MDA in computations.

4.15.1. Section I. **SUMMARY INFORMATION (Result Data for Publication)**

4.15.1.1. Item 1. Enter result from Section II, item H or from AFMAN 11-226 (I) Volume 3, Table 2-3.

4.15.1.2. Item 2. Enter result from Section III, item E or Section IV, item E.

4.15.1.3. Item 3. Enter results from Section VII, item G.

4.15.1.4. Item 4. Enter Yes or No (after completing section VI).

4.15.1.5. Item 5. Enter Yes or No (after completing section V).

4.15.1.6. Item 6. Enter Yes or No (after completing section VI).

4.15.2. Section II. **DETERMINATION OF TCH WITH VGSI**

4.15.2.1. Item D. Enter distance in feet along centerline.

4.15.2.2. Item E. Enter tangent of VGSI angle (i.e., VGSI angle is 3°, enter its tangent (0.0524).

4.15.3. Section III. **DETERMINATION OF VDP WITH VGSI**

4.15.3.1. Item B. Enter value from section II, Item H.

4.15.3.2. Item D. Enter tangent of VGSI angle (i.e. VGSI angle is 3°, enter its tangent (0.0524).

4.15.4. Section IV. **DETERMINATION OF VDP WITHOUT VGSI.** Item D. Enter tangent of descent angle or 3°, whichever is greater (i.e., descent angle is 2.5°, 3° is greater, enter tangent of 3° (0.0524).

4.15.5. Section V. **OBSTACLE CLEARANCE DETERMINATION, 20:1**

4.15.5.1. Item A. Self-explanatory. See AFMAN 11-226(I), Volume 1, Figure 14-5 or Figure 14-6A.

4.15.5.2. Item G. Subtract item F from item E and enter result. Also, answer "Yes" or "No" in Section I, Items 5 & 6.

4.15.6. Section VI. **OBSTACLE CLEARANCE DETERMINATION, 34:1**

4.15.6.1. Item A. Self-explanatory. See AFMAN 11-226(I), Volume 1, Figure 14-5 or Figure 14-6A.

4.15.6.2. Item G. Subtract Item F from Item E and enter result. Also, answer "Yes" or "No" in Section I, Item 4.

4.15.7. Section VII. **DME FIX AT VDP.** ***Note:*** First row is a calculation area. Result used in Item D.

4.15.7.1. Item A. Measure along centerline from abeam facility to EOR.

4.15.7.2. Item B. Enter value from Section III, Item E or Section IV, Item E.

4.15.7.3. Item D. Enter value from first row.

4.16. AF IMT 3642, Circling Computations. Complete this IMT manually when documenting USAF 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.

4.16.1. Item 1. **Circling Minimum Descent Altitude (CMDA) Based on Obstacle Clearance.** Ensure any expanded circling area obstacles are considered when applying criteria in **Attachment 3**, paragraph **A3.1.23.**. The highest obstacle in the circling or expanded obstacle clearance area shall be used.

4.16.2. Item 5. **Minima.** Show these values in the FLIP minima section format. The highest minima shall be entered in the minima section of AF IMT 3637.

4.17. DELETED.

4.18. AF IMT 3982, GPS/RNAV Combination Straight and Turning Missed Approach Length of Section 1. Do not use this IMT for procedures not supported by GPD. When necessary, document all manual calculations and include in procedure package.

Chapter 5

INSTRUMENT PROCEDURE PROCESSING

5.1. Requesting, Processing and Publishing Instrument Procedures.

5.1.1. In order for a new instrument procedure to be published, a requesting agency (i.e., MAJCOM, Air Force Component of a Unified Command, Unit Flying Organization, etc.) must identify the requirement and submit a request to the TERPS authority responsible for that location. At a minimum, requests should contain:

5.1.1.1. Name of the airfield or location desired.

5.1.1.2. Type of procedure. Examples: High or Low Altitude, Very High Frequency Omni-Directional Range (VOR); Instrument Landing System (ILS); and Tactical Air Navigation (TACAN).

5.1.1.3. Aircraft categories that will use the procedure.

5.1.1.4. 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.

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

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

5.1.1.7. Number of copies required if the procedure will be published in loose-leaf format.

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

5.1.2. The requesting agency should evaluate on a case-by-case basis the need to publish procedures at alternate airports or airports not frequently used and may recommend, with justification, a procedure for inclusion in the appropriate DoD FLIP. The request shall be sent with specific justification to the appropriate MAJCOM TERPS authority.

5.1.3. The requesting agency may request new instrument approach or departure procedures at domestic civil airports IAW FAA Order 8260.32.

5.1.4. The requesting agency shall forward publication requests for civil procedures to the proper MAJCOM TERPS office. Base requests for publication of civil approaches in DoD FLIP on operational requirements.

5.1.5. All instrument procedures will be published and distributed by NGA, except when a unique situation exists where there is an urgent need (due to war time/contingency operations, etc.) for the procedure and NGA will not be able to support the short notice requirement before it is needed. In this instance, MAJCOMs may locally process, publish and use these procedures until receipt of the NGA product.

NOTE: Do not send instrument procedures to NGA for loose-leaf publication when the procedure is only required for 30 days or less and NGA will not be able to support the short notice requirement before it is needed.

5.1.5.1. Upon completion, MAJCOMs shall immediately send HQ AFFSA/XOI an information copy of the locally published FLIP (export as a minimum the FLIP graphic depiction).

5.1.5.2. Locally published instrument procedures shall conform to IACC specifications to the maximum extent possible, contain an expiration date, a point of contact, and, if applicable, exercise name and the unit designation(s) of authorized users.

5.1.5.3. When a procedure is in the developmental phase, a MAJCOM/unit may produce a product for review and/or coordination purposes, and one of the following notes shall be published on the planview: "NOT FOR NAVIGATIONAL USE" or "FOR USE BY FLYABILITY/FLIGHT CHECK AIRCREW ONLY".

5.1.6. Publication of RADAR procedures.

5.1.6.1. Airborne RADAR Approaches (ARAs) shall be published in a graphic format (planview and profile).

5.1.6.2. PAR/ASR approaches are published in text format in Terminal FLIP products in the section identified as "RADAR INSTRUMENT APPROACH MINIMUMS". However, there may be situations where the PAR/ASR procedure is complex or in an obstacle rich environment, etc., which could justify publication in the graphic format also. Specifications exist for NGA to publish this type of portrayal.

5.1.6.3. Do not publish a descent angle/gradient for ASR approaches.

5.1.7. Contingency Operations. When a TLE is established IAW paragraph **1.4.1.2.**, process instrument procedure requests in support of contingency operations IAW this chapter and the following:

5.1.7.1. The TLE shall validate all contingency TERPS requirements to the maximum extent possible prior to requesting TERPS assistance from the applicable MAJCOM. The TLE shall refer to the TERPS AOR alignment as outlined in paragraph **1.4.** when determining the Office of Primary Responsibility (OPR) for each requirement.

NOTE: Central and South American requirements may be directed to HQ AMC AOS/OL-J.

5.1.7.2. The MAJCOM assigned the TERPS tasking (OPR) by the TLE shall develop and process each instrument procedure. Initially, these procedures will not be published in DoD FLIP and therefore will be classified and treated as a special use instrument procedures IAW paragraph **5.8.**.

5.1.7.3. The TLE shall coordinate with the OPR to determine format (hard copy, electronic copy, and/or acetate) and initial distribution requirements. The OPR shall forward the appropriate AF IMT(s) to NGA IAW paragraph **5.1.8.**, for loose-leaf publication. Subsequent distribution to aircrews of the NGA produced loose-leaf product shall be made by the TLE.

5.1.7.4. The MAJCOM developing instrument procedures for contingency operations shall be responsible for maintaining them for as long as required and shall provide the TLE with any changes requiring coordination within the using command. Close coordination between the OPR and TLE is essential to ensure safety of flight is not compromised at any time during the contingency operation.

5.1.8. Instrument Procedure Documentation and Processing. Create and maintain a procedure package folder containing all hard and soft-copy documentation listed below.

5.1.8.1. Required hard copy (paper) documentation includes the computer generated Approach/Departure Report and AF IMT 4333, Approach/Departure Signature Page. For procedures devel-

oped on USAF bases with a CE function, also include a completed AF IMT 813, Environmental Impact Statement.

NOTE: GPD will also output hard copy Obstacle Quality and Workspace Quality Reports, however these are intended to assist in aeronautical data resolution. Maintaining hard copies of these documents is not required.

5.1.8.1.1. Also include all hard copy source documentation relating to aeronautical or obstacle data revisions pertinent to the chart to include hard copy correspondence to MAJCOM TERPS function providing rationale for the change(s).

5.1.8.2. Required Soft Copy (electronic) documentation includes the entire content of the [procedure name] export folder to include the following files:

5.1.8.2.1. [workspace name].wks

5.1.8.2.2. [workspace name].xml

5.1.8.2.3. [procedure name].dbf

5.1.8.2.4. [procedure name]BLD.pdf

5.1.8.2.5. [procedure name]BLD.xml

5.1.8.2.6. [procedure name]PUB.pdf

5.1.8.2.7. [procedure name]PUB.xml

5.1.8.2.8. [procedure name].shp

5.1.8.2.9. [procedure name].shx

5.1.8.2.10. [procedure name].xml

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

5.1.8.2.12. [procedure name]-[date]-DEF.txt

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

5.1.8.2.14. [procedure name]-Waiver.pdf (when applicable). Note that there will be one waiver form for each non-standard condition, and labeled sequentially. Each must be retained as part of the procedure package.

5.1.8.2.15. Expanded Service Volume Request.pdf. The blank form is not required to be included in the electronic package, but is mandatory if completed.

5.1.8.2.16. [procedure name].Flyability.pdf

5.1.8.2.17. Radio Fix and Holding Data Record.pdf. Blank (fillable) form. Must be completed and saved.

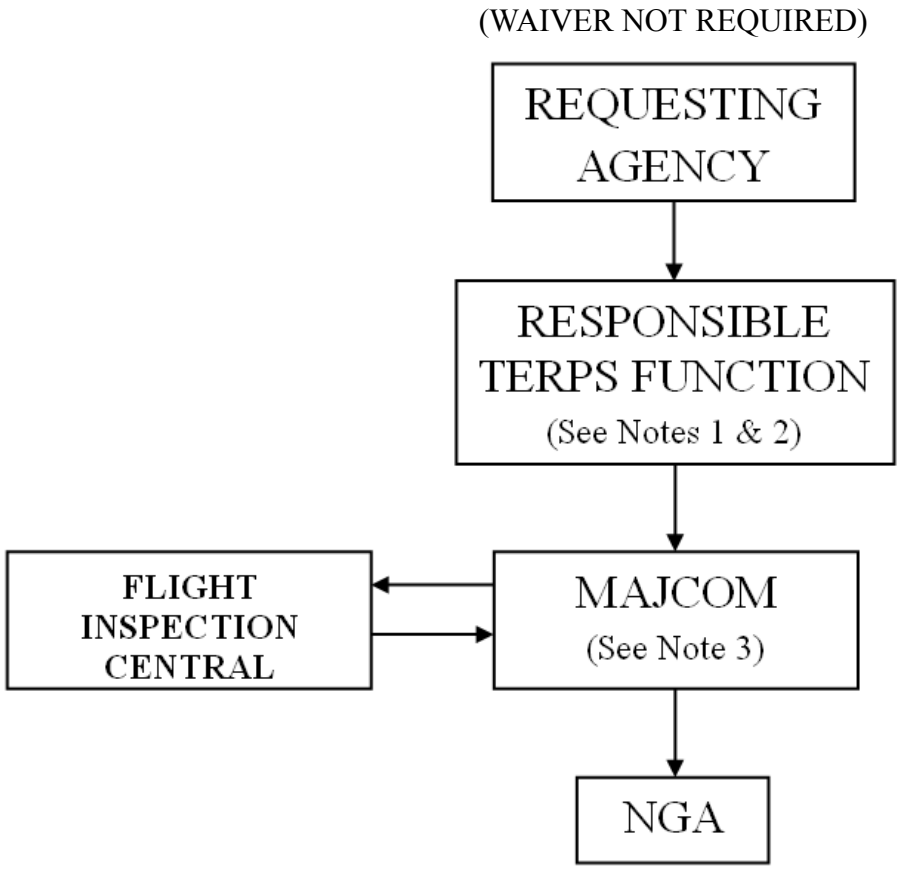
NOTE: During procedure export, GPD will prompt the user for a ‘save to’ location for the electronic files. The default is to the drive containing the “USAFIPD” directory in the ‘export’ folder under the specific procedure name. Ensure all required electronic files are selected prior to export and save to the workstation's hard drive.

5.1.8.2.18. In addition to GPD produced export files, include additional electronic documentation (to include scanned versions of hard copies) relating to aeronautical or obstacle data revisions pertinent to the procedure, along with correspondence to the MAJCOM TERPS function providing rationale for the change(s). Note that only the completed signature page (AF IMT 4333 Approach/Departure Signature Page) must be scanned and saved to electronic media, not the entire procedure Report.

5.1.8.3. Coordination (standard GPD procedure).

5.1.8.3.1. Prior to submitting to the MAJCOM TERPS function for review and approval, obtain required signatures on the hard copy procedure publication report. Along with the publication report, provide non-TERPS reviewers (senior operational commander, ATC, etc.) the FLIP graphic depiction along with other pertinent documentation/computations. Scan and add completed form to electronic documentation files.

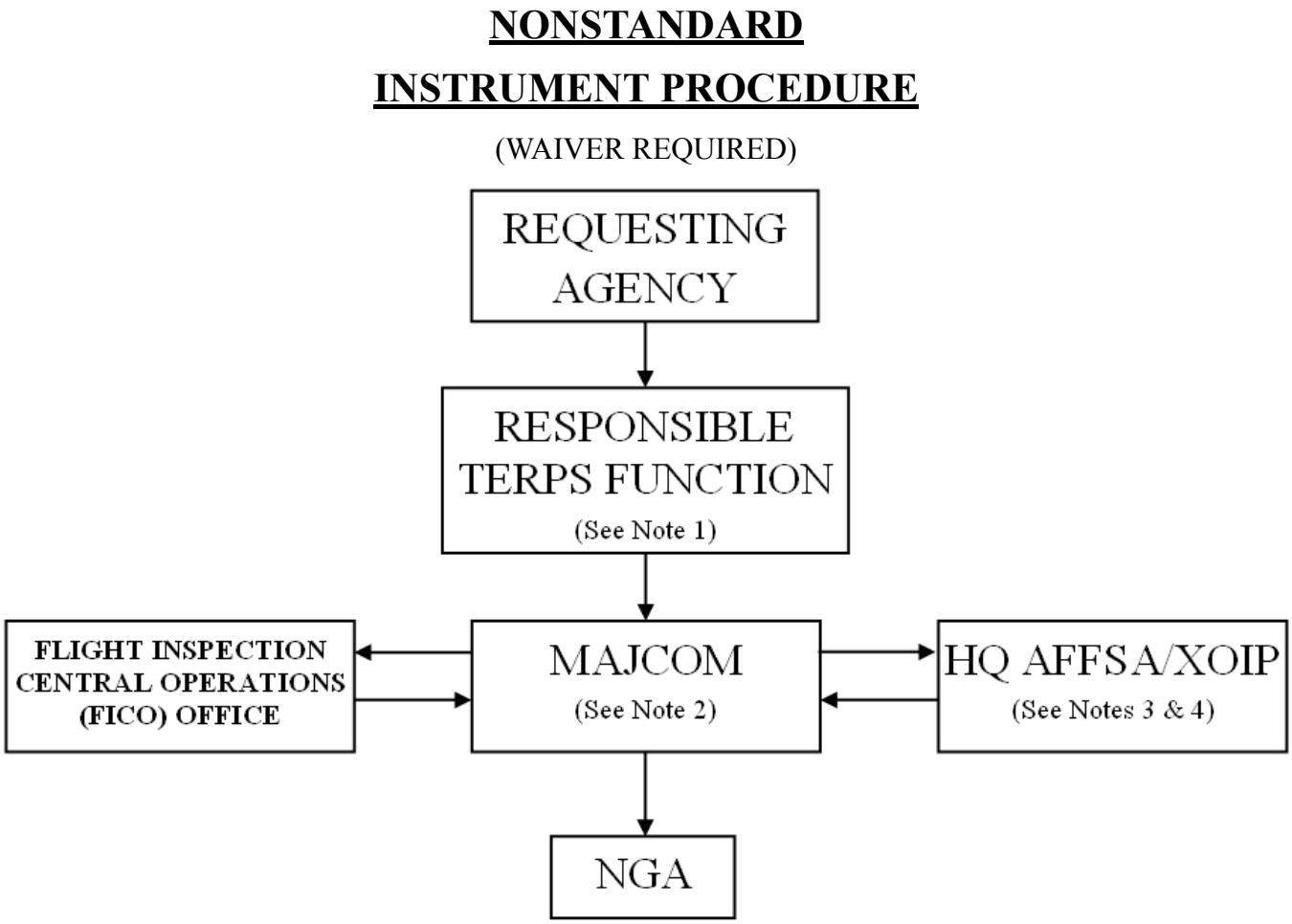
Figure 5.1. Processing Standard Instrument Procedures.



NOTES:

1. At locations where a qualified TERPS specialist is not available to develop and locally coordinate procedures, development and local coordination will be performed by the supporting MAJCOM.
2. When final review and approval authority is delegated below the MAJCOM, the approving unit will send the approved procedures to NGA for publication and a copy to the responsible MAJCOM.
3. After the MAJCOM TERPS office has reviewed, approved, and signed the procedure, it must be forwarded to the FAA for flight inspection services. See paragraph **8.3.1.** for conditions when flight inspection is not required.

Figure 5.2. Processing Nonstandard Instrument Procedures.



NOTES:

1. At locations where a qualified TERPS specialist is not available to develop and locally coordinate procedures, development and local coordination will be performed by the supporting MAJCOM.
2. After the MAJCOM TERPS function has reviewed and approved the nonstandard procedure, and after the MAJCOM/DO or the CFACC/JFACC has approved the nonstandard procedure, it must be forwarded to the FAA for flight inspection services. See paragraph **8.3.1.** for conditions when flight inspection is not required.
3. HQ AFFSA is the final approving authority before publication of nonstandard instrument procedures. All items/approval signatures must be completed before submitting to HQ AFFSA, including flyability check and flight inspection. When a waiver to criteria is questionable and the potential exists for disapproval due to being extreme in nature, contact AFFSA/XOIP for guidance prior to scheduling flight inspection.
4. HQ AFFSA/XOIP will advise MAJCOMs of waiver approval or disapproval using AF IMT 3980, ***Waiver.***

Table 5.1. INSTRUMENT PROCEDURE PACKAGE CONTENT REQUIREMENTS

Reviewing Agency	Standard Instrument Procedure	Nonstandard Instrument Procedure	FTIP - Standard Instrument Procedure (See Note 1)	FTIP - Nonstandard Instrument Procedure (See Note 1)
MAJCOM TERPS	AF IMT 4332 or 4333 Computation Data* Maps, Charts, or Drawings * ESV (When Applicable) FAA Form 8260-2 (As Required) Supporting Documents AF IMT 3992 or IMT 3993 (Flyability Check) AF IMT 813	AF IMT 4332 or 4333 Computation Data* Maps, Charts, or Drawings * ESV (When Applicable) FAA Form 8260-2 (As Required) Supporting Documents** AF IMT 3992 or IMT 3993 (Flyability Check) AF IMT 813 AF IMT 3980 (Waiver)	AF IMT 4332 or 4333 Computation Data* Maps, Charts, or Drawings * ESV (When Applicable) FAA Form 8260-2 (As Required) Supporting Documents AF IMT 3992 or IMT 3993 (Flyability Check)	AF IMT 4332 or 4333 Computation Data* Maps, Charts, or Drawings * ESV (When Applicable) FAA Form 8260-2 (As Required) Supporting Documents** AF IMT 3992 or IMT 3993 (Flyability Check) AF IMT 3980 (Waiver)
MAJCOM/DO/ CFACC/JFACC (or equivalent)	N/A	AF IMT 4332 or 4333* AF IMT 3980 (Waiver)	N/A	AF IMT 4332 or 4333* Computation Data* Maps, Charts, or Drawings * Supporting Documents** AF IMT 3980 (Waiver)
AFFSA/XOIP/CC	N/A	All items listed above that are required for MAJCOM TERPS	N/A	All items listed above that are required for MAJCOM TERPS
NGA	AF IMT 4332 or 4333*	AF IMT 4332 or 4333*	See paragraph 7.1.13.	See paragraph 7.1.13.

* Printouts of computer generated procedure reports/forms 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 that are automated with USAF GPD. When submitting procedures to NGA for publication or revision, include all applicable FAA Form 8260-2s, as required.

** Supporting documentation includes all items that support the waiver request (i.e., coordination letters, maps, flight inspection report, manual computations not on AF IMTs, etc.). Only include supporting documentation for those portions of the procedure that are affected by the waiver. When publishing FTIP in DoD FLIP, appropriate AIP information for a foreign procedure and/or information obtained by agreement from the host nation are also supporting documentation. Any host nation documentation used to develop the procedure and not published in English shall be translated into English; include a copy of the translation in the procedure package.

NOTE:

1. Listed content requirements are for FTIP based on ‘non-accredited’ host nation source (locations not included on the USAF FTIP Acceptance List). See **Chapter 7** paragraph **7.1.13.** for package content and processing requirements for FTIP based on ‘special accredited’ and ‘accredited’ host nation source. See paragraph **5.5.1.2.2.** for exception to documentation requirements when processing short notice waivers.

5.1.8.3.2. 'Zip' all electronic files and upload to the AFFSA FTP site in the appropriate MAJCOM directory under 'Uploads', in the 'Pending Review' folder. Follow up with an email or phone call to the MAJCOM TERPS function indicating a new file has been uploaded.

5.1.8.3.3. The MAJCOM TERPS function shall download the zipped 'export' files and review the manual edits documented in the export package. If justification/source documentation is adequate, make necessary changes to aeronautical data and/or import manual obstacle changes from the [procedure name]-OBS.txt file into GPD prior to chart import. When aeronautical data revisions are necessary, coordinate with the AFFSA GPD help desk to initiate DAFIF correction.

CAUTION: Following the workflow in this order is necessary to correctly restore the procedure.

5.1.8.3.3.1. Import the procedure to complete the review process. Ensure that the date/time stamp associated with each page of the exported procedure report is consistent with the date/time stamp associated with the imported procedure. Review procedure/segment construction, approach minimums, climb gradients/climb to altitudes, and specified fix altitudes for compliance.

NOTE: Validate procedure violations and system generated notes against the exported procedure Report file ([procedure name].pdf) instead of opening the report from the restored procedure in GPD. If the restored procedure has violations not included in the exported report, it is likely due to differences in the aeronautical or obstacle data maintained by the export workstation and that on the import workstation. Ensure currency of DAFIF/DVOF and recheck for manual revisions.

5.1.8.3.3.2. When approving a procedure, print the hardcopy AF IMT 4333, Approach/Departure Signature Page included in the export package and sign in the MAJCOM TERPS block. Scan and add the electronic file to the list of files in the export package. Save an electronic copy of the entire package to removable electronic media for the MAJCOM archives. 'Zip' the package and upload to the AFFSA FTP site in the appropriate MAJCOM directory under 'Uploads' in the 'Review Complete' folder. Follow up with an email or phone call to the unit indicating a new file has been uploaded.

5.1.8.4. Coordination (non-standard, or manually developed procedure). The amount of manual computations, drawings, and other hardcopy documentation required in these packages make it impractical to transfer them electronically via FTP as outlined in paragraph **5.1.8.3.**. Process in accordance with **Figure 5.1.** or **Figure 5.2.**, as appropriate, and send the package to the appropriate reviewing agency(s) via surface mail.

5.2. MAJCOM TERPS Responsibilities.

5.2.1. Ensure all data required by AFMAN 11-225, Section 214, is submitted to the flight inspection office prior to flight check operations IAW time limits detailed in paragraph **8.2.2.**.

5.2.2. Submit all new standard or special use instrument procedures (to include civil and/or host nation procedures) to the Aeronautical Safety Division of NGA IAW this AFI as shown in **Figure 5.1.** or **Figure 5.2.**. Provide the GPD-produced publication report and FLIP graphic depiction for automated procedures.

NOTE: Non-procedural changes and recommendations for improvement of FLIP product content/format are normally submitted by airfield operations IAW DoD FLIP General Planning, **Chapter 11**.

5.2.3. Forward all CONUS and Alaska departure procedures published in the IFR Take-off Minimums and (Obstacle) Departure Procedures Section of the DoD FLIP and all CONUS and Alaska RADAR procedures published in the RADAR Instrument Approach Minimums Section of the DoD FLIP to the National Aeronautical Charting Office (NACO). These instrument procedures may be emailed to NACO at: **mailto:9-AWA-NACO-NIMA4IAP@faa.gov**.

5.2.4. Plan the operational date for new procedures to coincide with the applicable AIRAC cycle date IAW FLIP General Planning (GP), **Chapter 11**, *Revision Schedules*. When this is not possible, the following caveat shall be published on the approach/departure plate: "EFFECTIVE BY NOTAM". Do not use this caveat for more than 90 days. See AFJMAN 11-208, *Department of Defense Notice to Airmen [NOTAM] System,* for additional NOTAM guidance.

5.2.5. Publish instrument approach procedures in a graphic format (planview and profile). Text only instrument procedures (NOTAM, message, etc.) shall not be implemented except in extreme emergencies. AFFSA/XOIP shall be notified whenever "text only" instrument procedures have been implemented.

5.3. Unit TERPS Responsibilities.

5.3.1. Provide sufficient documentation in the procedure package to permit a rapid and complete check of the instrument procedure by reviewing agencies designated in **Table 5.1.**.

5.3.2. Develop and process new procedures predicated on a programmed NAVAID or new runway as soon as practical prior to the estimated commissioning of the new NAVAID or runway.

NOTE: When new instrument procedures are approved and ready for flight inspection, the flyability check and flight inspection requirements may be completed simultaneously during the NAVAID commissioning flight inspection (see paragraph **8.1.2.**).

5.3.3. New approach/departure procedures published in the DoD FLIP in advance of their effective date shall be published with the following caveat: "EFFECTIVE BY NOTAM". Issue a NOTAM stating the procedure is authorized for use immediately following successful flight inspection. Include any changes required by flight inspection in the NOTAM.

5.3.4. Compile and maintain procedure packages as outlined in **Table 5.1.** and paragraph **5.1.8.**. Legible photocopies, scans, or faxes of hard copy forms/reports are satisfactory substitutes for original documentation.

5.3.5. Supporting documentation that affected the planning of the procedure (engineering surveys, foreign nation Aeronautical Information Publication (AIP), NAVAID or airspace limitations, flight inspection results, etc.). Submit requests for Expanded Service Volume (ESV), FAA Form 6050-4, ***Expanded Service Volume Request***, IAW paragraph **2.4.**, and include any supporting documentation in the procedure package.

5.3.6. Instrument procedure packages supporting procedures intended only for loose-leaf publication require the same documentation as prescribed in paragraph **5.3.5.**. Submit requests to the MAJCOM TERPS Office and include a list of all the addressees and the number of copies sent to each (include the DoD Activity Address Code {DODAAC} of recipients); send one copy to AFFSA/XOIP.

5.3.7. Provide the technical expertise and procedure alternatives (equivalent level of safety) necessary to help in drafting any waiver justification for nonstandard instrument procedures.

NOTE: MAJCOMs will send a copy of the waiver package to AFFSA/XOIP and maintain the original package until receipt of approval/disapproval notice. Then return the approval/disapproval notice and original package to the requesting unit.

5.4. DELETED.

5.5. Waiver Requests (Nonstandard Instrument Procedures). A waiver is required to permit deviation from U.S. TERPS criteria, and USAF International criteria as stated in this AFI, for instrument procedures at locations where the USAF has procedure development responsibility and at locations not accepted on the USAF Host Nation Acceptance List that are published loose-leaf or in DoD FLIP. Procedures developed for the USAF by the FAA at domestic civil airports that do not meet U.S. TERPS criteria shall be processed IAW FAA Order 8260.32, paragraph 10.

NOTE: Waivers to criteria can be granted for a period of two years (previous policy allowed for permanent waivers). When there is a continuing need for a waiver that was previously granted on a permanent basis, re-accomplish the waiver and submit it to AFFSA for review and approval.

5.5.1. Document all waiver requests using AF IMT 3980, ***Instrument Procedure Waiver***. Each non-standard instrument procedure will be processed independently. Do not make reference to other procedures as part of the waiver justification. Use a single AF IMT 3980 to document deviations to criteria and submit this IMT with the procedure package. GPD will automatically output to the export folder a filled waiver form (adobe format) for each non-standard condition, which satisfies this requirement.

5.5.1.1. Complete documentation and supporting data (see **Table 5.1.**) shall accompany the waiver request so reviewing offices can conduct an evaluation without additional research.

5.5.1.2. Units will provide the original procedure package plus two complete copies to the MAJCOM.

5.5.1.2.1. The MAJCOM shall mail one of the copies of the waiver package, with all maps, to HQ AFFSA/XOIP for processing. Faxed or electronically transferred packages will only be accepted after prior coordination with HQ AFFSA/XOIP.

5.5.1.2.2. Electronic versions of the requirements outlined in paragraph **5.5.1.1.**, to include maps, , and the completed, signed, flyability check IMT (faxed or scanned) will be accepted by AFFSA for short notice waiver processing of procedures under the following conditions:

5.5.1.2.2.1. Correspondence from the MAJCOM TERPS OIC or above, with justification for waiver processing without hard-copy documentation, will be included.

5.5.1.2.2.2. The hard copy documentation required in paragraph **5.5.1.1.**, to include maps, overlays, and the flyability check, shall be submitted by the MAJCOM to AFFSA within 3 days from the date the automated package is sent.

5.5.1.2.3. See **Table 5.1.** for package contents.

5.5.1.2.4. See **Figure 5.2.** for processing guidance.

5.5.2. Short-term (less than 30 days) extension requests must be addressed to AFFSA/XO with a copy to AFFSA/XOI and come from the Wing OG/CC or MAJCOM O-6 equivalent. They shall include justification for the short-term extension and impact if disapproved.

5.5.3. Waiver re-validation requests must be received on a new AF IMT 3980 NLT 10 days prior to expiration and shall include the following:

5.5.3.1. Completed AF IMT 3980, Sections 1 through 6.

5.5.3.2. Sections 7 & 8 of the new AF IMT 3980 do not require signatures. Enter "See Previous Waiver" in the comments portion of each section.

5.5.3.3. Copy of previous approval message/letter/AF IMT 3980.

5.5.3.4. Documentation showing the procedure was re-evaluated against the most current criteria and aeronautical data. Submission shall include all segment builds and any manual calculations.

5.5.3.5. Any additional information deemed appropriate.

5.5.4. Original approved waiver and any subsequent re-validation shall be retained with the procedure package.

5.5.5. When waiver processing by HQ AFFSA/XOIP is completed, the requesting MAJCOM will only receive a copy of AF IMT 3980.

5.5.6. When a nonstandard procedure is amended, reprocessing the current waiver is not required unless the amendment directly impacts the basis for the waiver.

5.6. AF IMT 3980 *, **Instrument Procedure Waiver***. This IMT is used to request approval of an exception to established instrument procedure criteria. Items 1 through 5 must be answered completely and accurately.

NOTE: GPD will automatically output to the export folder a filled waiver form (adobe format) for each non-standard condition. The text entered into GPD will be used to fill the appropriate blocks of the form. The output form is not editable.

5.6.1. Item 1. **Procedure Name.** Include Airport Name, 4-letter ICAO ID (FTIP only), City, and State or Country.

5.6.2. Item 2. **Specific Directive and Paragraph To Be Waived.** Identify each deviation/violation to criteria (USAF, ICAO or AATCP-1(B)) encountered during procedure development/review. Additionally, document what is creating the violation of criteria (i.e., "AFMAN 11-226(I), Volume 3, paragraph 904. Obstacles #214, 407, 408, and 412-415, penetrate the 7:1 transitional surfaces").

5.6.3. Item 3. **Reason For Waiver (Justification) and Operational Impact, If Not Approved.** Justify the need for the waiver and state the operational impact if the waiver is not approved. When stating the operational impact, be specific (i.e., "Historical weather data shows that Ceilings and Visibility's below 500 feet and 2 miles occur approximately 95 days per year. This translates into the loss of, at approximately 10 sorties a day, 950 sorties per year, seriously degrading our mission readiness and training ability").

NOTE: The fact that a procedure has existed for a number of years does not provide an equivalent level of safety and may not be used as a reason for the waiver justification.

5.6.4. Item 4. **Alternative(s) Considered and Reason For Rejection.** Explain each alternative considered used to eliminate the need for the waiver and state why they were not acceptable.

5.6.5. Item 5. **Equivalent Level of Safety Provided.** An equivalent level of safety ***must*** be established for each criteria deviation included in the waiver request to ensure that flight safety is main-

tained. An equivalent level of safety can be defined as a compensating measure to insure that the deviation from criteria does not have an adverse effect on the operation of aircraft. An example could be a warning note published on the procedure to have the pilot configure his aircraft for landing at a designated point due to a shorter than standard intermediate segment.

5.6.6. Item 6. **Submitted By.** The procedure specialist that designed/reviewed the procedure should be the submitter.

5.6.7. Item 7. Comments (**MAJCOM TERPS).** The MAJCOM TERPS Office will have the first opportunity to recommend approval or disapprove the waiver request/revalidation (see **5.6.7.2.** and **5.6.8.2.** below).

5.6.7.1. When the waiver is not approved, the reason for disapproval must be stated here.

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

5.6.7.3. The MAJCOM TERPS function OIC, Flight Commander, etc., or higher, shall be the approval/disapproval authority for Item 7.

5.6.7.4. Waiver revalidation requires MAJCOM TERPS coordination and signature.

5.6.8. Item 8. **MAJCOM FLYING OPERATIONS (Stan/Eval) ENDORSEMENT.** This endorsement is required to ensure that the MAJCOM flying personnel have the opportunity to review the waiver request to determine if there is any reason that the waiver should not be approved.

5.6.8.1. When the waiver is not approved, the reason for disapproval must be stated in the "Comments" portion of this item.

5.6.8.2. Waiver revalidation requires MAJCOM Stan/Eval coordination and signature.

5.6.9. Item 9. **HQ AFFSA ACTION.** HQ AFFSA is the final waiver approving authority. When the waiver is not approved, the reason for disapproval will be stated in the "Comments" portion of this item prior to AFFSA returning the IMT to the submitter.

5.7. Deleting Instrument Procedures. When a procedure is no longer required:

5.7.1. The requesting unit informs the responsible TERPS authority that the instrument procedure is no longer needed. (Organizations at any level of command may initiate this action.)

5.7.2. The responsible TERPS authority coordinates with other interested agencies/using organizations (MAJCOM, DoD, FAA, host nation, etc.).

5.7.3. Each agency/organization reviewing the requested deletion determines whether the deletion will adversely impact any known operations.

5.7.4. Ensure concurrence from all interested agencies is obtained prior to deleting the instrument procedure. After each agency/organization concurs with the request:

5.7.4.1. The MAJCOM TERPS office will send a cancellation notice to NGA.

5.7.4.2. The MAJCOM TERPS office will return fix names and identifiers no longer needed to NFDC.

5.8. Special Use Instrument Procedures. A special use instrument procedure is defined as a procedure developed IAW AFMAN 11-226(I) and AFI 11-230 for a unique operational requirement and published by NGA in a "loose-leaf" format only.

5.8.1. Special use instrument procedures must state: "For Use by (organization/exercise/operation) ACFT Only" in the planview.

NOTE: Other aircraft/DoD components may use these procedures only after receiving approval from the MAJCOM/DO, CFACC/JFACC responsible for the development and maintenance of the procedure.

5.8.2. Special use procedures being developed that do not meet applicable TERPS criteria (nonstandard procedures) must be coordinated with HQ AFFSA/XOIP for waiver approval (see paragraph **5.5.**).

5.8.3. Provide AFFSA/XOIP a copy of all published original and each subsequently updated special use instrument procedure (even when just updating the effective dates or amending a note).

Chapter 6

INSTRUMENT PROCEDURE MAINTENANCE

6.1. FLIP Maintenance. MAJCOM TERPS functions will establish a Flight Information Publication (FLIP) maintenance system (checklist, operating instruction, etc.) to track annual audits, AIP changes (at MAJCOMs dealing with host nation instrument procedures), NOTAMs, manual changes to aeronautical and obstacle data, and any related correspondence used to ensure instrument procedures are current and meet applicable criteria.

6.1.1. Annual Audit. The annual audit shall identify and validate the need for each instrument procedure (assuring mission requirements are being met), and ensure that all TERPS waivers are current and comply with paragraph **5.5.**, Waiver Requests (Nonstandard Instrument Procedures). Unit TERPS functions shall conduct an annual audit of all instrument procedures and provide results via written correspondence to the parent MAJCOM NLT 15 September using the AFFSA spreadsheet format (see paragraph **1.3.9.**).

6.1.2. Aeronautical data currency/GPD Automatic Evaluation (Auto Eval). In GPD Data Manager, import updates to aeronautical and obstacle data immediately upon receipt to ensure currency. DAFIF and DVOF are disseminated monthly. DTED and other products are updated as deemed necessary by NGA/NACO. Manual edits are made as necessary based on OE/AAA case studies, new construction, NAVAID changes, host nation AIP changes, NOTAMs, etc. After new data is imported, and/or after manual edits are processed, initiate an Auto Eval check on each saved procedure in every workspace to determine whether data changes have resulted in procedural changes. When Auto Eval indicates a change has taken place, restore the procedure to determine the extent of the revisions and whether terminal amendments are required. When procedural changes are necessary, export the procedure and process an amendment IAW **Chapter 5**.

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. A procedure is 'restored' and re-evaluated based on the current data environment each time it is opened.

6.1.2.1. Each saved procedure shall be restored, evaluated, and saved (not exported) at least once each six months regardless whether Auto Eval has indicated procedural changes or not.

6.1.2.2. Auto Eval is limited to checking those instrument approach and departure procedures that GPD currently supports. Auto Eval does not check ATC charts for changes after data import/revisions. Each saved chart shall be restored after data update/revision, and checked for new sector altitudes/violations.

6.1.3. Foreign Terminal Instrument Procedures (FTIP).

6.1.3.1. Review instrument procedures based on non-accredited host nation source IAW requirements in paragraph **6.1.2.**. Ensure source documentation used is current and that all changes have been documented and published correctly.

6.1.3.2. Review instrument procedures based on accredited and special accredited host nation source whenever new host nation source documentation is received to ensure published procedures and FTIP reviews are kept current. Re-accomplish the CHECKLIST for REVIEW and/or

PUBLICATION of FOREIGN TERMINAL INSTRUMENT PROCEDURES, **Attachment 7**. When required, re-accomplish all ceiling and visibility minima calculations.

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

6.1.3.3.1. Host nation AIP changes/revisions. Compare new information against the old information and against what is currently published in the DoD FLIP or posted on the GDSS.

6.1.3.3.2. US/host nation NOTAMs.

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

6.1.3.5. Maintain as much source information as possible.

6.1.3.6. Whenever possible, perform a full review of host nation source documentation in advance of it's effective date. Notify NGA of any procedural changes to published instrument procedures required prior to the applicable cut-off dates established in FLIP General Planning (GP), Chapter 11, for inclusion in next FLIP cycle. Ensure host nation effective date and DoD effective date coincide.

6.1.3.7. When time permits a full review and host nation changes will be effective before the next DoD FLIP cycle, issue a NOTAM documenting the required changes to the DoD FLIP. Notify NGA of the required changes via TAS Letter and cancel/revise the NOTAM after the changes are published in the DoD FLIP.

6.1.3.8. When a full review is not possible prior to the effective date of the host source, the DoD procedure shall be NOTAM'd "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 re-instate the procedure and cancel the "NOT AUTHORIZED" NOTAM. When the completed review reveals major changes not correctable by NOTAM, keep the procedure "NOT AUTHORIZED" until the corrected depiction appears in the DoD FLIP.

6.1.3.9. Where possible, establish a point of contact (POC) with the host nation to coordinate changes.

6.1.4. The parent MAJCOM TERPS function shall maintain instrument procedures/ATC charts for locations where a unit specialist is not assigned/available. In addition to the requirements of paragraphs **6.1.1.** and **6.1.2.** above, MAJCOMs shall:

6.1.4.1. Fulfill all unit responsibilities IAW **Chapter 1**. Develop and maintain a globalspace, workspace(s) and procedure packages as outlined in paragraph **5.1.8.**.

6.1.4.2. Coordinate with agencies proposing changes to have the effective date of the changes match the effective date of the FLIP cycle that will contain the new version. When changes must be effective before publication in the FLIP, issue the appropriate NOTAM to cover the time between the two dates.

6.1.4.3. Establish a POC at each location with the unit(s) requesting instrument procedure development/changes. The POC must provide the MAJCOM with pertinent changes to the airfield environment. 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. Also, establish a clear avenue of communications to ensure timely reporting.

6.2. Revising Instrument Procedures.

6.2.1. Submit all new standard or special-use instrument procedures (to include civil and/or host nation procedures) and procedural changes (see paragraph **6.2.2.**) to existing procedures to the Aeronautical Safety Division of NGA IAW this AFI 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)." Affect coordination with NGA using the GPD-generated publication form and FLIP graphic depiction.

6.2.2. Those changes affecting any fix, radial, bearing, course, track, altitude, minima, obstacle, holding pattern, climb table, time/distance table, procedure identification, and/or operational note/remark are defined as 'procedural changes'. Changes affecting other items are considered 'non-procedural' changes. Coordinate procedural changes with the original signatory agency/office IAW **Chapter 5** and as noted in paragraph **6.2.3.** below.

NOTE: Airfield Management will normally submit all non-procedural changes according to FLIP GP, Chapter 11. Non-procedural changes do not require processing through original coordinating channels; however, unit TERPS functions shall inform the MAJCOM TERPS office when making non-procedural changes.

6.2.3. Terminal Amendment System (TAS). When procedural changes require the amendment of an instrument procedure, the TERPS specialist will send a TAS letter to NGA. The TAS letter will document each procedural change required to make the instrument procedure compliant with current criteria. Assign a number to each amendment, beginning with the number one and indicate the amendment number in the procedure properties of GPD. Multiple procedural changes may be made in a single amendment. Retain electronic file copies of the original procedure and all prior amendments in the procedure package. All correspondence for processing the procedure will reference the current amendment number. During FLIP review (see paragraph **6.3.**), ensure the amendment number is depicted on the published IAP and so that the flight check pilot can use it to confirm currency of obstacle information.

NOTE: MAJCOM approval responsibility for each amendment is the same as for the original procedure package. All required approval signatures must be obtained for each amendment.

6.2.3.1. Approving Authority Signatures. Forward the GPD-generated publication report with a coordination letter describing the change(s) with applicable instructions to each agency that coordinated on the original package for their endorsement.

6.2.3.2. A NOTAM or a message may be used to make a procedural change. When this option is exercised, notify the applicable MAJCOM of the change. Forward a new or revised package to the MAJCOM within 30 working days.

NOTE: When raising the CMDA on a currently published instrument approach solely to meet floor of controlled airspace (FOCA) requirements, neither a flyability check nor a flight inspection is required. In GPD, annotate in the user defined notes the action taken with supporting rationale.

6.2.4. FTIP. Process revisions to host nation instrument procedures based on *non-accredited* host nation source published in the DoD FLIP and maintained by the USAF IAW paragraph **6.2.1.** above, except coordination with all original signatories is not required for each amendment.

6.2.5. Process revisions to host nation instrument procedures based on *accredited* and *special accredited* host nation source published in the DoD FLIP and maintained by the USAF IAW paragraphs **6.1.3.2.** and **6.2.1.** above except coordination with all original signatories is not required for each amendment.

6.3. Review of FLIP and Other TERPS Related Data (FLIP Review).

6.3.1. Instrument procedures. The initial FLIP review of an original instrument procedure shall be an in-depth validation of the planview, profile, minima block, radar minimums, and airport sketch to ensure the published information mirrors the instrument procedure package and to verify the accuracy of NGA produced FLIP products.

NOTE: Once the initial FLIP review has been completed, subsequent FLIP reviews of the same instrument procedure need not be as 'in-depth' (see paragraph **6.3.1.4.**).

6.3.1.1. Upon receipt of new paper FLIP products and/or update of the NGA web site, the responsible TERPS function shall complete a thorough review of either the paper FLIP version or the corresponding electronic version prior to the effective date of the applicable FLIP.

6.3.1.2. When an error is found on a procedure in one medium, the corresponding procedure in the other medium shall also be reviewed. When errors are found which are procedural in nature (see paragraph **6.2.2.**) and could jeopardize flight safety (regardless of the medium in which the error was made), initiate NOTAM action to either stop use of the procedure or list the corrections required to allow continued use of the procedure.

6.3.1.3. Document the completion of this review in the instrument procedure package on all of the following:

6.3.1.3.1. New procedures. Compare the new product against the procedure package. The possibility for errors is highest in new procedures being published for the first time.

6.3.1.3.2. Changes submitted to existing procedures. Check each procedure for errors when revisions have been submitted to NGA. Ensure the amendment number has been updated and a new Julian date has been assigned to the revised procedure.

NOTE: A change to the Julian date at the top of the plate indicates that either a procedural change or a non-procedural change has been made. Typically, non-procedural changes are made by NGA and are not submitted by the MAJCOM TERPS function.

6.3.1.3.3. All other existing instrument procedures, including RADAR INSTRUMENT APPROACH MINIMUMS and IFR TAKE-OFF MINIMUMS and DEPARTURE PROCEDURES.

6.3.1.4. FLIP reviews on individual instrument procedures conducted after the initial FLIP review (see paragraph **6.3.1.**) may be considered complete when there is no change to the Julian date from the same, previously published, instrument procedure.

NOTE: This in no way negates the requirements to review host nation source for new, revised and/or deleted instrument procedures or to track and follow-up on all applicable NOTAMs and/or TAS letters to NGA.

6.3.1.5. When FLIP review cannot be completed prior to the effective date of the applicable FLIP due to late web posting by NGA and/or delayed delivery of paper copy FLIP, take the following action(s), as appropriate:

6.3.1.5.1. Coordinate with NGA to determine the expected delivery date of the paper copy FLIP or the expected date the electronic version of the instrument procedure will be posted;

6.3.1.5.2. Send a NOTAM extending the effective date of the current FLIP or canceling affected instrument procedures, as applicable;

6.3.1.5.3. Cancel NOTAMs that extended the effective date of the now expired FLIP after the FLIP review has been completed on the current product.

6.3.2. Loose-leaf/locally published FLIP. Review new and/or revised loose-leaf/locally published FLIP IAW paragraph **6.3.1.** on receipt and during annual audit.

6.3.3. Base Civil Engineering Comprehensive Planning Maps/GIS equivalent and or GeoBase Common Installation Picture (CIP) Foundations. Review revised Base Civil Engineering Comprehensive Planning Maps or equivalent to verify changes/new information.

6.3.4. Changes to the airfield. Review planned or completed changes in airfield layout, facilities, lighting, etc. As soon as possible, determine the effect of proposed construction/engineering changes on instrument procedures.

Chapter 7

FOREIGN TERMINAL INSTRUMENT PROCEDURES (FTIP)

7.1. Publication of Foreign Terminal Instrument Procedures (FTIP) under the USAF FTIP Acceptance Program. IAW SECDEF policy, each service has the authority to establish a process that identifies, maintains, and periodically revalidates a list of nations and/or specific airports that meet instrument procedure criteria equivalent to US standards. This AFI and the USAF FTIP Acceptance Program implements the SECDEF policy for the USAF. It provides relief from completing a full manual or automated review on each instrument procedure derived from host nation (locations outside of U.S. jurisdiction) source documentation prior to use by DoD aircrews. By validating the level of reliability and accuracy of selected host nation flight inspection and instrument procedure development and publication practices, military and/or civil host nation instrument procedure programs may be added to the USAF FTIP Acceptance List. Use of the checklist at **Attachment 5** is required to assess the level of acceptability of each host nation program/airport being considered for accreditation. The bulk of the items/data to be assessed is contained within the host nation source documentation, i.e., Aeronautical Information Publication (AIP) data, NOTAMS, Aeronautical Information Circular (AIC) data, FLIP information, airway charts, etc. There are two categories for accepted host nation programs; **special accredited** and **accredited**. Additionally, individual airports may be evaluated for the **special accredited** category. Host nation programs/airports that have not been evaluated and those that do not meet the guidelines set forth in this chapter will not be added to the list. By default, these airports and programs are considered **non-accredited**.

7.1.1. Host nation instrument procedure programs are categorized as special accredited when the USAF has placed a very high degree of confidence in the host's flight inspection practices and instrument procedure development and publication practices. These host nation programs are high quality programs considered equal to our own (FAA/DoD) as determined by the answers to checklist items in **Attachment 5** of this AFI and a review by AFFSA/XOI of supporting documentation provided by the MAJCOM performing the evaluation.

NOTE: When deemed appropriate by MAJCOM TERPS authorities, individual host nation airports may be considered for the special accredited status even though the corresponding host nation instrument procedure program is categorized as accredited or non-accredited. The evaluation and approval process for an individual airport is the same as for a specific instrument procedure program.

7.1.1.1. HQ AFFSA/CC is the approval authority for the special accredited status for both instrument procedure programs and individual airports.

7.1.1.2. Paragraph **7.1.9.** contains guidance for special accredited Category II/III ILS procedures.

7.1.2. Host nation instrument procedure programs are categorized as accredited when the USAF has placed confidence in the host's flight inspection practices and instrument procedure development and publication practices. Final approval authority for this category rests with HQ AFFSA/XOI.

NOTE: Individual host nation airports are not eligible for the accredited status; this category applies only to instrument procedure programs.

7.1.3. The 'default' category for all FTIP is non-accredited. Host nation flight inspection practices, instrument procedure programs, and all associated host nation source documentation, i.e., Aeronautical Information Publication (AIP) data, NOTAMS, Aeronautical Information Circular (AIC) data,

FLIP information, airway charts, etc., will be categorized as non-accredited when they have not been considered for evaluation under this program by the MAJCOM TERPS function.

NOTE: Non-accredited instrument procedure programs shall be evaluated using US TERPS or USAF International standards (see **Attachment 9**).

7.1.4. FTIP Acceptance Approval Requirements.

7.1.4.1. The MAJCOM TERPS function will accomplish the following when evaluating candidate instrument procedure programs/airports for acceptance.

7.1.4.1.1. Inform AFFSA/XOIP as early as possible that a host nation instrument procedure program or a host nation airport is being considered for accreditation; include the accreditation status being requested. AFFSA/XOIP, in turn, will request comments from other MAJCOMs, NGA, USAASA, NAVFIG, and FAA (AFS-420 and AVN-160).

NOTE: Only evaluate candidate programs/airports that are within your MAJCOM TERPS AOR.

7.1.4.1.2. Review the FAA *International Flight Information Manual*, FAA *Notices To Airman-Domestic/International,* and the Foreign Facilities Approved for Category II and Category III Operations on the FAA web site **http://www.faa.gov/avr/afs/afs410/index.cfm** for potential concerns that may discourage acceptance of the candidate program/airport.

7.1.4.1.3. Review the results of the FAA Flight Standards Service International Aviation Safety Assessment (IASA) Program at **http://www.faa.gov/avr/iasa/index.cfm**. The special accredited status *will not be granted* to instrument procedure programs in countries that are rated Category 2 (*do not meet* ICAO Standards) by the IASA program unless adequate justification endorsed at the MAJCOM 3-letter level or above is provided to AFFSA/XOIP. This restriction does not apply to individual host nation airports.

7.1.4.1.4. Notify AFFSA/XOIP of all known host (civil and/or military) declared exceptions to U.S. TERPS/ICAO PANS-OPS/NATO AATCP-1(B) and flight inspection standards when answering **Attachment 5** checklist items A5.6 and A5.7. HQ AFFSA will be the final approval authority for USAF acceptance of exceptions to these criteria.

7.1.4.1.5. Inform the applicable US Defense Attachè Office (USDAO) that a host nation instrument procedure program or a host nation airport is being considered for addition to the USAF FTIP Acceptance List. Request input from that office for concerns that may discourage acceptance of the candidate program/airport.

NOTE: Each country's military and civilian instrument procedure development process must be evaluated separately when each uses different methods or when performed by separate offices.

7.1.4.1.6. Send AFFSA/XOIP a copy of all host AIP/FLIP documentation reviewed, and any correspondence made with host nation officials during the evaluation process. Representative samples of FTIP (approach and departure procedures) shall be submitted versus the entire AIP/FLIP document.

7.1.4.1.7. Complete and submit the **Attachment 5** checklist with the other documentation. All requests sent to AFFSA must be approved and endorsed at the MAJCOM 3-letter level or above before the instrument procedure program/airport is considered by AFFSA for addition to the USAF FTIP Acceptance List.

7.1.4.2. In addition to the requirements in paragraph **7.1.4.1.**, the following requirement shall have been met and the other items shall be accomplished prior to submitting a host nation's civil or military program for the special accredited status.

7.1.4.2.1. The program shall have been categorized as accredited on the USAF FTIP Acceptance List for a minimum of 24 months.

7.1.4.2.2. The MAJCOM TERPS function shall review documentation (i.e., instrument procedure packages and associated correspondence) concerning the accredited host program for the previous two years for potential concerns that may discourage granting the special accredited status to the program by AFFSA. The data reviewed shall be representative of both small and large airports.

7.1.4.2.3. A site visit (not an inspection) by representatives from the MAJCOM TERPS function to the host's procedure development office shall be conducted to review and document their flight inspection practices, procedure development standards, and publication practices.

7.1.4.3. The request to special accredit an instrument procedure program shall include documentation that all requirements in paragraphs **7.1.4.1.** and **7.1.4.2.** have been met and must be approved and endorsed at the MAJCOM 3-letter level or above. When any of the requirements in **7.1.4.2.** cannot be met, include in the request rationale for submitting the program for special accredited status without meeting the requirement(s). HQ AFFSA/CC will make the final decision based on provided rationale.

7.1.4.4. Individual host nation airports may be evaluated/approved for special accredited status separately from that nation's instrument procedure development program. In addition to the requirements in paragraph **7.1.4.1.** (see exception in paragraph **7.1.4.1.3.**), the MAJCOM TERPS function will accomplish the following prior to submitting an airport for the special accredited status.

7.1.4.4.1. A site visit (not an inspection) to the airport's instrument procedure development office shall be conducted to review and document the flight inspection practices, procedure development standards, and publication practices specific to that airport.

7.1.4.4.2. Historical data for the past two years reference the primary instrument runway(s) for precision/non-precision approach procedures and for departure procedures shall be evaluated for potential concerns that may discourage acceptance of the airport.

7.1.4.5. The request to special accredit an individual host nation airport shall include documentation that all requirements in paragraphs **7.1.4.1.** and **7.1.4.4.** have been met and must be approved and endorsed at the MAJCOM 3-letter level or above. When either of the requirements in **7.1.4.4.** cannot be met, include in the request rationale for submitting the airport for special accredited status without meeting the requirement(s). HQ AFFSA/CC will make the final decision based on provided rationale.

7.1.5. Maintaining FTIP Acceptance Approval.

7.1.5.1. To ensure all standards continue to be met and for programs/airports to remain accepted, the MAJCOM TERPS function shall re-evaluate programs and airports on a biennial basis. This re-evaluation may be conducted at any time during the two years from the date of initial acceptance by AFFSA.

NOTE: A 30-day extension beyond the 2-year period for accredited programs may be requested from AFFSA/XOI. A 60-day extension beyond the 2-year period for special accredited programs and airports may be requested from AFFSA/CC. Extension requests shall be received at AFFSA at least 10 days prior to acceptance approval expiration. Include rationale that has been approved and endorsed at the MAJCOM 3-letter level or above with each extension request.

7.1.5.1.1. Re-accomplish the **Attachment 5** checklist.

7.1.5.1.2. Perform a 're-validation' visit to special accredited programs and airports IAW paragraph **7.1.4.4.**. Failure to conduct and document the 're-validation' visit to special accredited programs and airports within the timeline specified coupled with no request for an extension (see paragraph **7.1.5.1.*NOTE***) will justify immediate revocation of this status by HQ AFFSA/CC.

NOTE: Site visits are not required when submitting a host nation's program for the accredited status or when re-validating accredited programs.

7.1.5.1.3. Monitor the FAA IASA Program for changes to a country's category status.

7.1.5.1.3.1. When AFFSA has granted special accredited status to a country's military or civil program and the country no longer meets ICAO standards IAW the IASA Program, the responsible MAJCOM shall notify AFFSA/XOIP and recommend either downgrading the program or keeping the program special accredited.

7.1.5.1.3.2. Adequate justification endorsed at the MAJCOM 3-letter level or above is required to keep the program special accredited. AFFSA will make a determination based on a review of the MAJCOM's submission.

7.1.5.1.4. Forward the results of the re-evaluation to AFFSA/XOIP for review. Include a recommendation for the program/airport to either retain the current status, or for it to be upgraded or downgraded, as applicable. AFFSA will make a determination based on a review of the MAJCOM's submission.

7.1.5.2. After a host nation's program/airport is granted accreditation and the MAJCOM becomes aware of a condition that would have precluded the initial approval of either status, take the following actions;

7.1.5.2.1. Special accredited programs/airports.

7.1.5.2.1.1. Notify AFFSA/XOIP of the new condition/change(s) to the host nation program. Individual airports will be removed from the USAF FTIP Acceptance List and programs will be downgraded one category to the accredited status by AFFSA.

7.1.5.2.1.2. NOTAM all affected instrument procedures "Not Authorized" until the appropriate review is completed and either an amended NOTAM is issued or the N/A NOTAM is rescinded.

7.1.5.2.1.3. Perform the appropriate TERPS review IAW **Figure 7.1.** based on the downgrade on all affected instrument procedures.

7.1.5.2.1.4. Pursue all required waiver actions on procedures now based on non-accredited source.

7.1.5.2.2. Accredited programs.

7.1.5.2.2.1. Notify AFFSA/XOIP of the new condition/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 status. Based on the MAJCOM recommendation and an evaluation by AFFSA/XOIP, AFFSA/XOI will either approve the request to retain the accredited status or remove the program from the USAF FTIP Acceptance List.

7.1.5.2.2.2. NOTAM all instrument procedures downgraded to non-accredited as "Not Authorized" until the appropriate review is completed and either an amended NOTAM is issued or the N/A NOTAM is rescinded.

7.1.5.2.2.3. Perform a complete TERPS review IAW **Figure 7.1.** based on the downgrade on all affected instrument procedures.

7.1.5.2.2.4. Pursue all required waiver actions on procedures now based on non-accredited source.

7.1.5.3. AFFSA/XOIP responsibilities under the USAF FTIP Acceptance Program.

7.1.5.3.1. Review and evaluate all MAJCOM provided documentation pertaining to requests for initial accreditation of candidate programs/airports and all subsequent biennial re-evaluations of candidate programs/airports.

7.1.5.3.2. Maintain and distribute the USAF FTIP Acceptance List. This list documents host nation instrument procedure program status (distinguishing between civil and military) that the USAF has reviewed and approved as ‘accredited’ or ‘special accredited’. It also lists AFFSA/CC approved ‘special accredited’ airports.

NOTE: The USAF FTIP Acceptance List shall not be forwarded/distributed/given to any agency outside of the USAF without prior written approval from AFFSA/XOI.

7.1.5.3.3. Inform the NAVFIG, USAASA, and FAA of completed FTIP acceptance actions.

7.1.5.3.4. Notify the appropriate MAJCOM TERPS function whenever it becomes aware of changes to the status of approved host nation instrument procedure programs, AIPs, and IAPs, or when the country no longer meets ICAO standards IAW the FAA IASA Program.

7.1.5.3.5. Make the appropriate recommendation to AFFSA/XOI and AFFSA/CC for approval or disapproval of accreditation requests.

7.1.6. Publishing FTIP in the DoD FLIP. When requesting publication of a foreign instrument procedure in the DoD FLIP, the requestor/requesting unit should include a copy of the Foreign Terminal Instrument Procedure (FTIP) or clearly identify the required procedure in the request. MAJCOMs shall process requests for publication of FTIP in the DoD FLIP IAW the following (see **Figure 7.2.**):

7.1.6.1. Select instrument procedures to be published in DoD FLIP to satisfy DoD requirements at foreign locations where a US Government agency is not responsible for instrument procedure development, provided:

7.1.6.1.1. The instrument procedure is published in an international AIP or acquired as the result of a written agreement. This agreement may be between the MAJCOM and the applicable host nation air Attachè Office (USDAO), local USAF flying organization, or host nation aviation authority. This agreement shall insure that the MAJCOM is informed of changes or revisions made by the host nation as they occur.

NOTE: The only approved sources for translating information/instrument procedures obtained from an AIP not published in English are NGA, a qualified translator on the MAJCOM TERPS staff, or the US Air Attachè office (USDAO) located in the country where the instrument procedure is located.

7.1.6.1.2. An international aeronautical information service (NOTAMs, etc.) is available for the procedure.

7.1.6.1.3. The procedure can be safely flown, as depicted or explained, using US Air Force instrument flight procedures contained in AFMAN 11-217, *Instrument Flight Procedures*, and other applicable directives.

7.1.6.2. Coordinate with host nation aviation and/or instrument procedure authorities:

7.1.6.2.1. For approval to publish new, USAF developed, instrument procedure(s) when existing host nation procedures do not meet operational requirements or when the host does not publish.

7.1.6.2.2. When altering an existing FTIP, except for higher ceiling and visibility minima, higher emergency safe altitudes, higher minimum safe altitudes, or other changes permitted by an established agreement with the host nation, or as stated in this chapter.

7.1.6.3. FTIP to be published in the DoD FLIP that are based on non-accredited host nation source, must have a complete TERPS evaluation (either manual or automated) of all segments (including holding, minima, and minimum sector altitudes) done by the MAJCOM prior to use.

7.1.6.4. Initiate waiver action IAW paragraph **5.5.** for criteria violations to accepted standards on instrument procedures based on non-accredited host nation source.

7.1.6.4.1. In situations where the rounding places the radial published in the DoD FLIP outside the straight-in criteria parameters, the procedure does not meet straight-in criteria and a straight in approach is not authorized without a waiver.

7.1.6.4.2. Publication of circling minima only (in lieu of straight-in minima) does not eliminate the need to obtain a waiver for nonstandard straight-in final approach course alignment.

NOTE: Instrument procedures based on accredited or special accredited host nation source and FTIP at special accredited airports listed on the USAF FTIP Acceptance List do not require waiver action for any deviation to accepted standards.

7.1.6.5. Coordinate with the requesting agency and appropriate air traffic control units, as required.

7.1.6.6. Plan the operational date for new procedures to coincide with the FLIP General Planning (GP), **Chapter 11**, *Revision Schedules*. When this is not possible, the following note shall be published on the approach/departure plate: "Effective by NOTAM". Do not use this caveat for more than 90 days. See AFJMAN 11-208, *Department of Defense Notice to Airmen [NOTAM] System,* for additional NOTAM guidance.

7.1.6.7. Ensure all applicable USAF IMTs and FAA forms are completed to the maximum extent possible.

7.1.6.8. Ensure all requests for publication sent to NGA conform to requirements in this AFI and to paragraph 5 of the "Working Agreement Between NIMA [sic] and DoD Flight Information

Coordinating Committee (FCC) On Processing Foreign Terminal Instrument Procedures (TERPS)."

NOTE: IAW paragraph 3d of the Working Agreement, when NGA has a problem publishing any part of any host nation procedure requested by the MAJCOM TAS letter, AFFSA/XOIP will determine whether or not the item is required for safe implementation of the instrument procedure in the DoD FLIP. When the determination is made that the data is required as published by the host, AFFSA/XOIP will direct NGA to publish per the MAJCOM TAS letter as a Special Military Request (SMR).

7.1.6.9. Do not alter FTIP identification.

NOTE: When the identification differs from AFMAN 11-226(I), Volume 1, paragraph 161 criteria, document the intent of the procedure in the remarks section of the AF IMT 3637; i.e., "The host nation identifies this FTIP as "TACAN/ILS R-35" but only provides ILS final approach guidance and minima." In this example, publish "NOT AUTHORIZED" in the S-TAC-35 minima block.

7.1.6.10. Publish all FTIP warning and caution notes.

NOTE: When host nation notes are confusing or when translating the host nation language into English, use good judgment. Ensure these notes are clear and make sense prior to publishing in DoD FLIP.

7.1.6.11. Publish all FTIP procedural restrictions.

NOTE: Some FTIP documentation is located in the host AIP; not directly on the instrument procedure. Research of host AIP and other host documentation may be required to make the DoD published instrument procedure present a complete and accurate representation of the FTIP.

7.1.6.12. Establish and publish minimum safe/sector altitudes and emergency safe altitude no lower than altitudes specified by the host nation. Addition of an emergency safe altitude requires prior approval from the host nation.

NOTE: Combine sectors on nonstandard host nation MSAs when required to meet DoD/IACC publication specifications.

7.1.6.13. Identify and publish *all* host nation IAFs. When the host does not publish an IAF, or when unable to determine IAF intent from host nation documentation, coordinate with host nation TERPS authorities to establish an IAF prior to publication in the DoD FLIP.

NOTE: NGA requires all IAFs to be identified to provide FMS programming capability.

7.1.6.14. State FTIP published alternate minimums verbatim unless the DoD procedure is annotated "NOT FOR CIVIL USE." In those cases, do not publish alternate minimums.

7.1.6.15. Include FTIP feeder routes and associated data/altitudes. Addition of a route or establishing a minimum flight altitude requires host nation approval.

7.1.6.16. Publish FTIP circling restrictions.

7.1.6.17. Add VDPs only if specifically requested by the proponent and the host approves.

7.1.6.18. NAVAIDs and holding patterns that have been identified on the FTIP that are not part of the procedure shall be depicted on the DoD procedure plate.

NOTE: Host nation ATC may require use of these NAVAIDs by DoD aircrews.

7.1.6.19. When the FTIP (source) depicts a time/distance table, it shall be depicted on the DoD procedure even when DME is required for the procedure. This provides timing 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:

7.1.6.19.1. Convert distances expressed by the host in statute miles or kilometers to nautical miles; round this converted distance to the nearest tenth of a nautical mile and publish the rounded value.

7.1.6.19.2. Whether the host publishes a time/distance table from the FAF or from a step down fix to threshold, determine where the missed approach point (MAP) is located. Develop the time/distance table based on the FAF to MAP distance or the step-down fix to MAP distance, as appropriate.

7.1.6.19.3. When the host has published multiple step-down fixes, develop the time/distance table from the step-down fix nearest the MAP.

7.1.6.19.4. Develop and publish the flying time in minutes and seconds from FAF to MAP or from step down fix to MAP, as applicable.

7.1.6.20. When reviewing data on the FTIP, compare the data to what is also published on area and enroute charts. Look for discrepancies in altitudes or common fix locations that should be the same on all sources. When differences are found, coordinate with host nation authorities to determine the correct information.

NOTE: Nonstandard host nation source (host nation source received from non-host nation sources/officials, i.e., USDAO, local USAF military officials, etc.) shall be treated as non-accredited with the following exception: when procedures to ensure nonstandard host nation source is updated and forwarded to the MAJCOM TERPS authority are established and outlined in a MOU/MOA between US officials at or representing the host nation location and the applicable MAJCOM IAW **7.1.6.1.1.**

7.1.7. FTIP Holding Pattern Evaluation.

7.1.7.1. When evaluating holding patterns and the maximum holding altitude cannot be determined, evaluate the holding pattern to the ESA altitude or 10,000 feet above the published minimum holding or Initial Approach Fix (IAF) altitude, whichever is greater.

7.1.7.1.1. When this altitude indicates a change to the host nation holding pattern, lower the selected maximum holding altitude and re-evaluate.

7.1.7.1.2. Continue this process until the selected altitude allows use of the holding pattern as published on the FTIP and publish the validated maximum holding altitude on the DoD FLIP.

7.1.7.2. A maximum holding altitude determination is not necessary for FTIP based on accredited and special accredited host nation source unless the review identifies a need to determine one.

7.1.7.3. Only publish the maximum holding altitude when required to ensure separation from obstacles.

7.1.8. Publishing FTIP Missed Approach Procedures.

7.1.8.1. When a host nation publishes more than one missed approach, all of them shall be published on the DoD FLIP.

7.1.8.2. When a host nation publishes a missed approach procedure/instructions for radar procedures, publish them in the "Radar Instrument Approach Minimums" section in the FLIP (Terminal).

7.1.9. ILS Category II/III Procedures.

7.1.9.1. Foreign nation Category II/III ILS procedures approved by the FAA are posted on the FAA AFS-410, Flight Operations Branch, web site: **http://www.faa.gov/avr/afs/afs410/catbbs.cfm**.

NOTE: 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 at the same location.

7.1.9.2. Category II/III ILS FTIP that have been approved by the FAA on the FAA AFS-410 web site may be reviewed and/or published under the guidelines established in this AFI for instrument procedures based on special accredited host nation source *even though the Category II/III procedure may be located in an accredited or non-accredited location*.

7.1.9.3. Category II/III ILS FTIP *not on the FAA AFS-410 web site* are subject to the review and/or publication requirements associated with FTIP based on accredited or non-accredited host nation source, as applicable.

7.1.10. TERPS Review of FTIP. This review is done to determine whether or not an FTIP is safe and accurate and whether or not it conforms to accepted standards. The TERPS review may be done using any one of the accepted standards; U.S. TERPS, ICAO PANS-OPS, or USAF international criteria (see **Attachment 9**). When the review reveals non-compliance with the selected standard, the reviewer must document the deviations on the review. Determine what action (normally some type of caution note) is necessary, if any, to compensate for each deviation.

7.1.10.1. TERPS review of FTIP based on accredited host nation source shall be conducted IAW **Attachment 7**.

7.1.10.1.1. USAF GPD software may be used in conjunction with the checklist at **Attachment 7**.

NOTE: The USAF International criteria set of GPD may be used to evaluate FTIP developed with ICAO criteria.

7.1.10.1.2. Evaluation of obstacles for Required Obstacle Clearance (ROC) is not required.

7.1.10.1.3. The checklist or the AF IMT 4333 must be signed and dated by the procedure specialist conducting the review.

7.1.10.1.4. Review the applicable host nation AIP/FLIP products to determine if departure procedures have been established for obstacle avoidance. When a departure procedure has been established, provide this information to the requester. When the host has not established a diverse (omnidirectional) departure or when diverse departure information is not available, notify the requester that a diverse departure evaluation was not accomplished and that a diverse departure will not be authorized.

NOTE: When the airfield does not have a departure procedure and it appears to be located in an obstacle rich environment, consider developing an appropriate workspace to accomplish a diverse departure (omnidirectional) assessment using USAF GPD.

7.1.10.2. TERPS review of FTIP based on non-accredited host nation source (use of USAF GPD is mandatory when the procedure/segment type is supported).

7.1.10.2.1. Evaluation of obstacles for ROC is required in each segment of the instrument procedure.

7.1.10.2.2. FTIP to be reviewed for a specific mission/exercise/operation must have a complete TERPS evaluation (either manual or automated) of all segments (including holding, minima, and minimum sector altitudes) done by the MAJCOM prior to use.

7.1.10.2.2.1. The AF IMT 4333 must be signed and dated by the procedure specialist conducting the review.

7.1.10.2.2.2. When a visual segment evaluation identifies penetrations to the 20:1 OIS that are not lighted, identify them to the requester (include the amount of penetration) in the review letter for consideration to limit procedure use to daylight operations only to the affected runway (see paragraph **7.5.2.5.3.**).

7.1.10.2.3. When instrument procedures based on non-accredited host nation source do not conform to the selected standard, the reviewer must document the deviations on the review.

7.1.10.2.4. Determine whether or not the final approach course radial published on the FTIP meets straight-in criteria and document any violations to straight-in criteria in the review.

7.1.10.2.5. When conducting the TERPS review on instrument departure procedures include the requirements of paragraph **7.1.10.1.4.** above. Additionally, a diverse (omnidirectional) departure obstacle assessment shall be accomplished. When penetrations are found and the host nation has not published an obstacle driven departure procedure, advise the requester of the finding.

7.1.10.2.5.1. Provide a diverse (omnidirectional) departure to avoid the penetration(s) or

7.1.10.2.5.2. Publish the note: "Diverse departure not authorized".

7.1.10.3. Take the following actions when conducting the TERPS review:

7.1.10.3.1. Review the FAA *International Flight Information Manual* and FAA *Notices To Airman-Domestic/ International* for potential concerns that may discourage use or acceptance of FTIP at the requested location.

7.1.10.3.2. Use USAF GPD to the maximum extent possible. Use DVOF and/or DTED Level 1 (or higher). Full DTED coverage must be available; i.e., no missing cells for any part of any segment of the instrument procedure. The use of digital map products (CADRG , etc.) is authorized to validate controlling obstacles.

7.1.10.3.3. When conducting a manual evaluation, take care to ensure terrain lines and obstacles on the border of the trapezoids are considered when the "segment review" method is used (without a MOC developed). It is not necessary to develop a Master Obstruction Chart (MOC) covering a 100 NM radius when conducting the TERPS review.

7.1.10.3.4. Use the appropriate scale paper map for each segment of the procedure as defined in **Table 7.1.**, when available. Use the next lowest map scale when the scale required is not available.

Table 7.1. MAP Scales Required (Review or Publication)

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 – 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

NOTE: **Adverse assumption for vegetation shall be applied as appropriate when using DTED and map products. Printed/plotted NGA Compressed Arc Digitized Raster Graphics (CADRG) maps shall not be used in-lieu-of the appropriate scale paper map for manual evaluations.**

7.1.10.3.5. Document in the TERPS review letter when deviating from map scale requirements established in **Table 7.1.**. Include the map scale required, the map scale used, and the vertical and horizontal accuracy of the map that was used in the evaluation of the FTIP.

7.1.10.3.6. Flyability checks.

7.1.10.3.6.1. When the appropriate scale paper map products outlined in **Table 7.1.** do not exist or are not available to evaluate a segment(s) in a timely manner, *and* when DVOF and/or DTED Level 1 (or higher) are not available, the flyability check shall be performed in day VMC prior to being used under IMC conditions.

NOTE: When either the appropriate scale paper maps or DVOF/DTED are available, a flyability check is not required.

7.1.10.3.6.2. Ensure all segments that have *not* been evaluated using the appropriate scale paper product are assessed during the flyability check. Conversely, when a 1:500,000-scale map was available and used to evaluate the holding pattern, it would not be necessary to fly the holding pattern during the flyability check.

NOTE: See paragraph **7.1.9.** for Category II/III instrument procedure guidance.

7.1.10.3.7. Document completed reviews IAW the standard format outlined in the Memorandum of Understanding (MOU) established by HQ AMC. Include appropriate comments when a procedure does not meet recognized obstruction clearance and/or when flight inspection abnormalities are known to exist. Forward all completed reviews to HQ AMC/A36AT for posting to the GDSS. The MAJCOM conducting the review shall be responsible for maintaining review currency and informing the requester when changes are required.

7.1.10.4. Reviewed FTIP will receive continuous maintenance IAW paragraph **6.1.3.2.** while the review remains effective. If the FTIP has been sent to NGA for publication, MAJCOM approval

authority and the review effective date may extend up to the anticipated publication date in the appropriate FLIP. Specify an expiration date or the anticipated publication date in the review.

7.1.10.4.1. When maintenance of the reviewed procedure has been stopped for any reason, and a new request for use of the FTIP is received, the review must be re-accomplished.

7.1.10.4.2. When subsequent/additional requests for a procedure review are made and maintenance has been continuous, the procedure does not have to be reviewed again. For example: when a procedure will be required for an extended period of time or is awaiting publication, and request(s) come in for a review, the process ***does not*** have to be re-initiated; the current review may be used to satisfy the new request.

7.1.10.4.3. When the requested procedure is in another MAJCOM's TERPS AOR, the MAJCOM that conducted the original or current review retains maintenance responsibility until the operation/exercise expires or until maintenance responsibility is transferred.

7.1.10.5. When more than six reviews over a 12 month period are required at the same location, the MAJCOM TERPS function responsible for that location should take steps to publish the required procedures from that location in DoD FLIP.

7.1.11. FTIP Departure Procedure Validation.

7.1.11.1. When publishing FTIP (approaches or departures) in the DoD FLIP, determine whether or not the host nation has established obstacle driven departure procedures for the location. When it is determined that the host nation has established obstacle driven departure procedures, publish the host nation departure procedures in the "IFR Take-Off Minimums and (Obstacle) Departure Procedures" (T) section IAW paragraph **3.3.**.

NOTE: Document USAF developed departure procedures at host nation locations on AF IMT 3634, Departure Procedure (DP). These procedures are subject to the flyability check and flight inspection requirements stated in paragraph **7.3.**

7.1.11.2. Use the following guidelines when publishing departures based on accredited and special accredited host nation source.

7.1.11.2.1. Review the applicable host nation AIP/FLIP products to determine if departure procedures have been established for obstacle avoidance.

7.1.11.2.2. When there are no departure procedures published in the AIP and it is not possible to determine whether or not a diverse departure is permitted, annotate each procedure with the T and publish "Diverse Departures Not Authorized" in the "IFR Take-Off Minimums and (Obstacle) Departure Procedures" section.

7.1.11.2.3. When an ATC departure procedure is published in the AIP and it is intended to be used as the only departure procedure for obstacle avoidance, annotate each procedure with the T and publish "Rwy XX, Use (NAME of DP/SID) for Obstacle Avoidance" in the "IFR Take-Off Minimums and (Obstacle) Departure Procedures" section.

7.1.11.3. Use the following guidelines when publishing departures based on non-accredited host nation source.

7.1.11.3.1. In addition to the requirements of paragraph **7.1.11.2.**, a diverse departure obstacle assessment shall be accomplished. When penetrations are found and the host nation has not

published an obstacle driven departure procedure, advise the host nation of the finding(s), establish a climb gradient for the appropriate departure quadrant to avoid the penetration(s), and establish a departure procedure package.

7.1.11.3.2. When there are no departure procedures published in the AIP and it is not possible to determine whether or not a Diverse Departure is permitted, annotate each procedure with the ▼T and publish "Diverse Departures Not Authorized" in the "IFR Take-Off Minimums and (Obstacle) Departure Procedures" section.

7.1.11.3.3. When an ATC departure procedure is published in the AIP and it is intended to be used as the only departure procedure for obstacle avoidance, annotate each procedure with the ▼T and publish "Rwy XX, Use Published DP/SID for Obstacle Avoidance" in the "IFR Take-Off Minimums and (Obstacle) Departure Procedures" section.

7.1.12. Departure End of Runway (DER) Crossing Restrictions. When evaluating FTIP DER crossing restrictions ('screen heights') for either publication or for a TERPS review, do not approve for use a 'screen height' lower than published by the host without first obtaining approval from the appropriate host nation aviation officials.

7.1.13. FTIP Package Content.

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

7.1.13.1.1. A copy of the applicable correspondence requesting the procedure;

7.1.13.1.2. A copy of the cover letter with instructions to NGA for publication;

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

7.1.13.1.4. A copy of all approach minima calculations when the host minima is incomplete or not published on the host approach procedure.

NOTE: Include minima computations (showing DA/MDA/CMDA, HAT/HAA, ceiling and visibility value computations) in the procedure package. Nonprecision computations may be documented on the reverse side of AF IMT 3640. Do not send computation sheets to NGA. Include notations when sources of obstacle data, computed values, and nonstandard criteria can cause misunderstanding by reviewing levels.

7.1.13.1.5. A procedure log to track amendments/reviews and any other actions taken.

7.1.13.1.6. A copy of each NGA produced procedure plate beginning with the original.

7.1.13.1.7. A graphic depiction of the instrument procedure other than the NGA produced plate.

NOTE: After the FTIP is published in the DoD FLIP, the planview and profile from the DoD FLIP shall be used to assist in illustrating changes being submitted to NGA as an amendment.

7.1.13.2. In addition to the documentation requirements in paragraph **7.1.13.1.**, document and maintain instrument procedure packages for FTIP based on accredited host nation source by including, at a minimum, the following:

7.1.13.2.1. A completed *Checklist for Review or Publication of Foreign Terminal Instrument Procedures* (see paragraph **7.1.10.**);

7.1.13.2.2. Flyability check documentation (see paragraph **7.3.**).

7.1.13.3. In addition to the documentation requirements in paragraph **7.1.13.1.**, document and maintain instrument procedure packages for FTIP based on non-accredited host nation source IAW **Chapter 5**, **Table 5.1.**.

NOTE: Minima computations may be completed by USAF GPD and need not be documented separately.

7.2. Aircrew Use of FTIP Not Published In U.S. Government (DoD or FAA) FLIP. IAW AFI 11-202, Volume 3, *General Flight Rules*, Chapter 8, MAJCOM TERPS offices must review instrument approach and departure procedures not published in a DoD or FAA FLIP (see **Figure 7.2.**). IAW AFI 11-202, Volume 3, *General Flight Rules*, Chapter 8, paragraph 8.3.1.2, this review may be waived by the MAJCOM/DO, JFACC/CFACC, or equivalent (see paragraph **7.2.7.**).

7.2.1. In cases where the requesting authority has no TERPS function and the TERPS review is performed by a USAF TERPS authority outside of the requesting authority's chain of command, the Operational Risk Management (ORM) decision(s) and approval to use the FTIP shall be obtained from the requesting MAJCOM flying operations authority, CFACC/JFACC, or the command authority exercising operational control of the mission aircraft after the review is completed. The requesting MAJCOM or MAJCOM equivalent flying operations authority (CFACC/JFACC) shall determine the specific office in their chain of command in which this authority is vested (not the MAJCOM that performs the TERPS review).

7.2.2. MAJCOMs shall establish methods for review requests to be directed to the MAJCOM TERPS function. The MAJCOM TERPS function should check the HQ AMC Global Decision Support System (GDSS) and/or coordinate with other MAJCOMs to determine if a review of the procedure has already been accomplished.

7.2.2.1. When required procedures are based on special accredited host nation source, a review of the procedures is not required when using the host government sanctioned FLIP. However, when the MAJCOM receives a request to review a commercial FLIP (e.g., Jeppesen, etc.) based on special accredited host nation source, a comparison review shall be conducted (see paragraph **7.2.6.**).

7.2.2.2. Reviews shall be completed and forwarded to HQ AMC/A36AT IAW the MOU on Disseminating FTIP Information via AMC GDSS for posting to the GDSS (**https://www.afd.scott.af.mil/cgi-bin/LCUTL/afd.exe**).

7.2.3. The MAJCOM TERPS function responsible for conducting the review should receive a review request at least 7 duty days prior to date of anticipated use. The request shall consist of at least the following:

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

7.2.3.2. The airport name(s).

7.2.3.3. The names and/or types of instrument procedures required. The requester shall be responsible for identifying all instrument procedures to be reviewed. This information can be obtained from the applicable nation's AIP or terminal FLIP product, Jeppesen product, etc. The request shall indicate the specific volume, section, page number, and date.

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

NOTE: It is important to have the mission aircraft's navigational equipment capability identified in the request to eliminate reviews on instrument procedures that could not be flown.

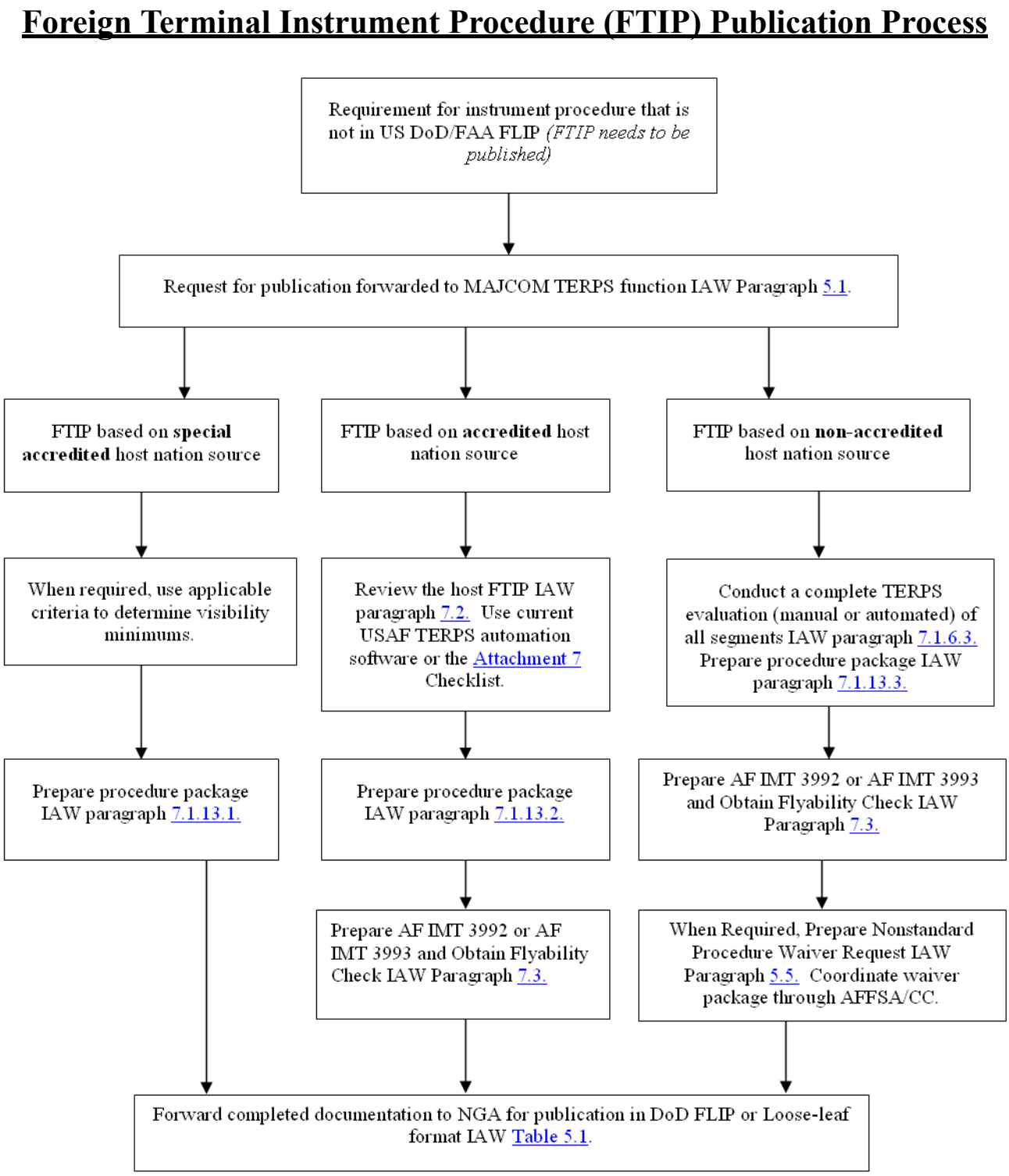
7.2.4. When the required instrument procedures are not posted on the GDSS or when a posted review has expired, aircrews should request a review or an updated review from the appropriate MAJCOM. When a MAJCOM requiring a procedure review requests review responsibility from another MAJCOM, it may be delegated to them.

7.2.5. IAW SECDEF policy, USAF aircrews may use special accredited, host nation published (host government sanctioned AIP, terminal FLIP product, etc.) instrument procedures without a TERPS review by the MAJCOM.

7.2.6. Comparison review. A comparison review is a 'corner-to-corner' review between a commercially produced product (e.g., Jeppesen, etc.) and the corresponding host nation product. When the user requests a review of any commercially produced instrument approach or departure procedure that supports any host nation location, the MAJCOM TERPS function shall also review the corresponding host nation produced product if not currently published in the DoD FLIP, prior to USAF aircrew use of the commercial product. The review of the host nation product constitutes the TERPS review and shall be conducted prior to the comparison review.

7.2.7. The TERPS review may be waived when the procedure is required for operations defined as an urgent requirement to fly short notice, humanitarian, contingency, MEDEVAC, "special" access and urgent State Department missions.

Figure 7.1. FTIP Publication Process



7.2.7.1. The applicable MAJCOM/DO, JFACC/CFACC, or equivalent may waive the TERPS review. When this authority's grade is below O-8, the waiver authority will lie with the first O-8 or above in the operational chain of command with responsibility for mission risk assessment. This waiver authority will not be further delegated.

7.2.7.2. When this waiver authority is exercised, MAJCOMs will ensure the aircrew and applicable MAJCOM TERPS office is notified that authorization has been given to use the procedure without review.

7.3. FTIP Flyability Check/Flight Inspection Requirements for Publication in DoD FLIP.

7.3.1. An actual (live) flyability check, flown IAW paragraph **8.1.**, shall be accomplished prior to publication unless any one of the requirements in paragraphs **7.3.1.1.**, **7.3.1.2.**, or **7.3.1.3.** is met.

7.3.1.1. Procedure is based on accredited or special accredited host nation source.

7.3.1.2. A US FAR Part 121 air carrier routinely serves the location. Contact the US air carrier to determine if special restrictions have been established for operating at this airport. The results of this inquiry will be documented in the remarks section of the AF IMT 3634, ***Departure Procedure (DP)*** or AF IMT 3637, ***Instrument Approach Procedure*** in the procedure package or in a memorandum when the procedure package does not contain either IMT. When the air carrier has established restrictions, the MAJCOM will obtain and evaluate these restrictions to determine whether or not they should be applied to the DoD procedure (FAA Order 8260.31 requires air carriers to provide this information to the Air Force). Document instances when the air carrier does not respond or refuses to divulge information and contact AFFSA for assistance. When publication of the procedure is required prior to resolution by AFFSA, a flyability check is required.

7.3.1.3. The FAA has flight inspected the instrument procedure. A copy of this flight inspection report will be considered an acceptable substitute for AF IMT 3992, ***Approach Flyability,*** or AF IMT 3993, ***Departure Flyability*** and shall be maintained with instrument procedure package.

NOTE: The flight inspection report must specifically state "SIAP verified IAW Order 8200.1A, USSFIM, Section 214.31" or the "SIAP Verified" block must be checked. Rationale: there are locations where only the NAVAID is inspected IAW FAA Order VN 8200.3, POLICY WITH RESPECT TO MILITARY PROGRAM PROCEDURES FOR FLIGHT INSPECTION OF FOREIGN-OWNED AIR NAVIGATION FACILITIES, and not the associated instrument procedures.

7.3.2. A flight simulator or tabletop review will be accomplished prior to publication when a flyability check is not required IAW paragraph **7.3.1.1.** and/or paragraph **7.3.1.2.** above. Document the flight simulator or tabletop review using AF IMT 3992, ***Approach Flyability,*** or AF IMT 3993, ***Departure Flyability***, whichever is appropriate. These forms shall be maintained with the instrument procedure package.

NOTE: 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 US FAR Part 121 air carrier operations."

7.3.3. 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/radio reception, 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 can be made when departing, if practical.

7.3.4. Amendments to existing, published procedures do not require flyability checks or tabletop/simulator reviews.

7.3.5. FTIP Flight Inspection Requirements.

7.3.5.1. When publishing a host nation procedure obtained from an AIP or via agreement for existing procedures, a flight inspection is required IAW paragraph **1.3.4.4.** to be accomplished prior to publication in the DoD FLIP.

7.3.5.2. When the MAJCOM has been given the authority to develop and publish a procedure at a host nation location, a flight inspection of the procedure shall be obtained.

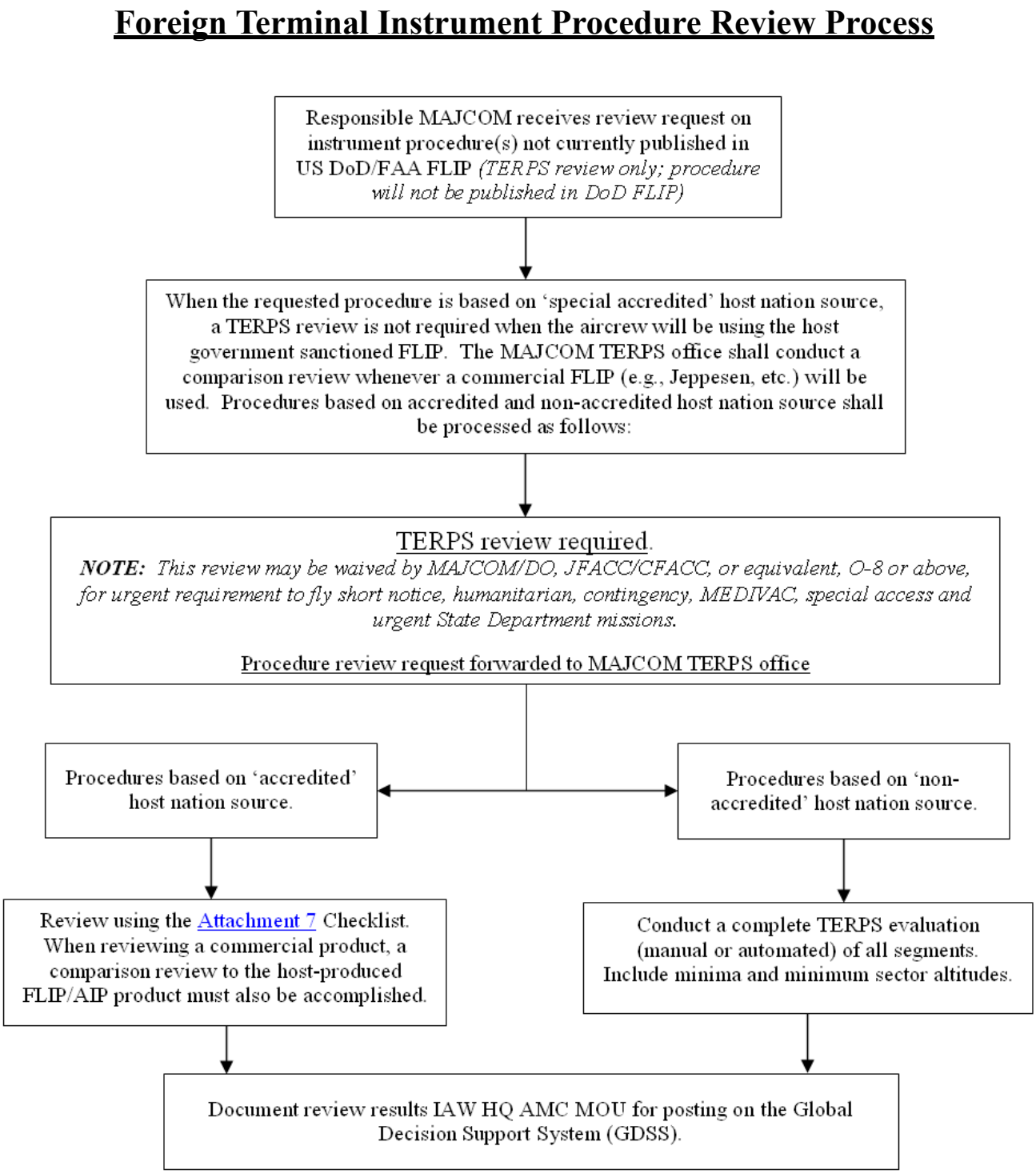
7.3.5.3. Flight inspection may be performed by any of the following;

7.3.5.3.1. The FAA or

7.3.5.3.2. An ICAO certified/approved host government or private flight inspection authority

NOTE: Flight inspections conducted by a host nation flight inspection authority are 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 criteria.

Figure 7.2. Process for Reviewing FTIP



7.4. FTIP Procedure Turns.

7.4.1. 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-degree offset of the 45/180-degree procedure turn when they are not shown on the foreign procedure.

7.4.2. When a "Remain within Distance" is not published by the host nation, determine the intended "Remain within Distance" for the procedure turn and publish it.

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

7.5. Metric Minima. When developing or reviewing FTIP, determine the units of measurement (for example; meters, feet, or statute miles [SM]) used by the host in air-to-ground communications for ceiling, RVR, and prevailing visibility (PV) at each airfield. The same units of measurement used by the host must be published on the DoD FLIP product and provided to aircrews in the TERPS review.

7.5.1. Convert host nation climb and descent gradients expressed as a percentage to a *foot-per-nautical-mile* (ft/NM) value. Example: When converting 6.8% into a gradient expressed in ft/NM, multiply the percentage by 6076.11548 (.068 X 6076.11548 = 413.1758526 ft/NM).

NOTE: 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 foot-per-nautical-mile (ft/NM) value. The differences are small and inconsequential, thus coordination with the host is not necessary. Example: When converting a 3.3% host nation climb gradient, consider it equal to 200 ft/NM even though mathematically it converts to 200.5 ft/NM (200.5 would normally be rounded up to 201 which would be rounded up again for publication purposes to 210).

7.5.1.1. When a host nation publishes QFE heights, they shall be published in parentheses below the associated QNH altitudes.

NOTE 1: A pressure type altimeter calibrated in accordance with the Standard Atmosphere when set to a QNH altimeter setting will indicate altitude above sea level (MSL).

NOTE 2: A pressure type altimeter calibrated in accordance with the Standard Atmosphere when set to a QFE altimeter setting will indicate height above the QFE reference datum.

NOTE 3: 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.

7.5.1.1.1. Metric Altitudes.

7.5.1.1.1.1. Convert meters to feet by dividing the meter value by 0.3048.

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

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

7.5.1.1.1.2.2. Departure procedures (prior to reaching the enroute segment), Feeder, Initial, Intermediate segment – 100-foot increment.

7.5.1.1.1.2.3. FAF, stepdown fix, MDA - 20-foot increment.

7.5.1.1.1.2.4. DH – 1-foot increment.

7.5.1.1.2. QFE Altitudes.

7.5.1.1.2.1. The difference between the QNH and the QFE should equal the field elevation, or the threshold elevation if the threshold is more that 2 meters (7 feet) lower than the field elevation.

7.5.1.1.2.2. Convert and round metric QNH values to US QNH values.

7.5.1.1.3. Do not convert and round metric QFE values. Derive QFE values by subtracting the elevation in **7.5.1.1.2.1.** from the altitudes in **7.5.1.1.2.2.**

7.5.2. FTIP Approach Minima Validation. Refer to AFMAN 11-226(I), Volume 1, Chapter 3, when required to compute or validate FTIP ceiling and visibility minima. Convert feet and SM values to the host unit of measurement (normally meters) and publish the metric minima values. Publish the higher of resultant computations or the host's published values. Adjust minima upward when necessary to publish reportable weather values IAW **Attachment 2**. Specific guidance on some of the paragraphs in AFMAN 11-226(I), Volume 1, Chapter 3 follows.

NOTE: DoD published changes to FTIP minima values due to rounding, adjusting upward to meet publishable values, or application of any requirement in paragraph **7.5.2.**, do not require coordination with the host nation prior to publication.

7.5.2.1. When the touchdown zone elevation (TDZE) is not known use the threshold elevation (THRE) for computing the height above touchdown (HAT).

7.5.2.2. When both the TDZE and the THRE are not known use the airport elevation for computing the HAT.

7.5.2.3. Publish ceiling values based on the height above airport (HAA) value. When the host nation uses the TDZE or THRE instead of the field elevation to calculate the HAA, recalculate and publish the HAA using the field elevation.

7.5.2.4. Publish a note in the profile anytime HAT figures are not according to US TERPS criteria. Example: "NOTE: HAT calculated from threshold".

7.5.2.5. Paragraph 332, Effect of Obstacles. When obstacles penetrate the visual assessment surfaces, visibility values will be affected. Use criteria contained in AFMAN 11-226(I), Volume 1, paragraph 251. Apply the following:

7.5.2.5.1. Procedures based on accredited host nation source do not require evaluation using paragraph 251.

NOTE: MAJCOM TERPS authorities may evaluate procedures based on accredited host nation source IAW paragraph 251 when deemed necessary. When an evaluation is accomplished and a penetration of the 20:1 OIS is found, the obstruction must be identified on the procedure and the host nation informed of this potential hazard (see paragraph **7.5.2.5.3.**).

7.5.2.5.2. Procedures based on non-accredited host nation source shall be evaluated using paragraph 251. When a penetration of the 20:1 OIS is found, the obstruction must be identified on the procedure (see paragraph **7.5.2.5.3.**) and the host nation informed of this potential hazard.

7.5.2.5.3. Publish a note identifying the 20:1 OIS penetration. Example: "Trees 120 AGL/220 MSL .4 NM from threshold, 50 feet right of course. USAF: Straight-In procedure to Rwy XX/ Circling to Rwy XX at night requires approval from MAJCOM/DO or equivalent".

7.5.2.6. Paragraph 334a. Do not apply.

7.5.2.7. Paragraph 334b. Do not apply.

7.5.2.8. Paragraph 342. When runway markings and/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 3992/3993.

7.5.2.9. Paragraph 360. Do not apply.

7.6. NOTAMs.

7.6.1. 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 FLIP, correct the DoD procedure by issuing a NOTAM reflecting the changes made by the host. When the host changes are extensive in nature, issue a NOTAM not authorizing use of the DoD procedure until a revised procedure can be published in the DoD FLIP.

7.6.2. Issue NOTAMs on FTIP published in the DoD FLIP. Do not issue NOTAMs on the host nation procedure (source).

7.6.3. Specify the exact DoD published instrument procedure affected (include amendment number as applicable) in the NOTAM.

7.7. DELETED.

Chapter 8

FLYABILITY CHECK AND FLIGHT INSPECTION REQUIREMENTS

8.1. Flyability Check of Instrument Procedures. Except as indicated in this AFI, each new instrument procedure published by the USAF shall have a flyability check (either 'live', 'simulator', or 'table-top') completed prior to submission for flight inspection. A DoD aircrew shall complete a 'live' flyability check on each USAF developed instrument procedure prior to initial publication.

NOTE: 'Simulator' or 'table-top' reviews are not acceptable on instrument procedures developed by the USAF.

8.1.1. Document the flyability check using AF IMT 3992 or AF IMT 3993. The pilot conducting the flyability check should simulate the most restrictive aircraft category and must evaluate the entire procedure. The procedure is acceptable if the pilot conducting this check determines that:

8.1.1.1. The procedure is operationally sound and required aircraft maneuvering is consistent with good operating practices.

8.1.1.2. Cockpit workload is acceptable for a low time pilot with minimal IFR/IMC experience.

8.1.1.3. Charts can be easily interpreted and contain proper information.

8.1.1.4. The procedure ensures safety of flight using the guidance in AFMAN 11-217, *Instrument Flight Procedures,* or as explained in the procedure.

8.1.1.5. See **Attachment 8** for instructions on the use of AF IMT 3992 and AF IMT 3993.

8.1.2. When a flyability check cannot be completed (NAVAID not available/commissioned, 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, flyability check considerations must be documented on the flight inspection report.

NOTE: AF IMT 3992 or AF IMT 3993 is not required in this instance.

8.1.3. Flyability checks shall be performed within 120 days of the original request from the TERPS authority, unless otherwise coordinated. When the flyability check is not completed within the allotted time, notify the unit requesting the procedure that because a flyability check was not completed, the request for the procedure has been cancelled and must be re-submitted for procedure development to be re-initiated.

8.2. Flight Inspection of Instrument Procedures. Flight Inspection IAW FAA Order 8200.1 (AFMAN 11-225) is the final step in the process of certifying an instrument procedure. Instrument procedures developed by the U.S. Air Force that require the use of Instrument Flight Rules or will be used in instrument meteorological conditions (IMC) shall be flight inspected IAW AFMAN 11-225, Section 214, except as indicated in this AFI. Submit requests for flight inspection services IAW instructions in FAA Order 8240.32, *Request for Flight Inspection Services.*

8.2.1. Each instrument procedure package submitted for flight inspection shall contain the following:

8.2.1.1. A cover letter stating, as a minimum, all appropriate points of contact and an address to where the completed package is to be returned. Additionally, if the procedure is a revision, define

(in bullet statements) what has changed on the procedure and what requires flight inspection consideration.

8.2.1.2. The paper copy approach or departure procedure report from GPD, and an electronic copy of the procedure build from GPD, as appropriate.

8.2.1.3. Maps. 1:100,000 scale planimetric/topographical charts or the next best available scale, are recommended.

8.2.1.3.1. A planimetric map is defined as one that displays only the horizontal positions of features represented. It is distinguished from a topographic map by the omission of terrain relief. The features usually shown on a planimetric map include rivers, lakes, and coast lines; vegetated areas (forests); cities, transportation routes, and public utility facilities; and political and private boundary lines. Planimetric maps created using GPD and the appropriate vector product layers (VMAP, UVMAP) with the procedure plotted to correct scale meet this requirement. Ensure quarter degree grid lines are depicted. Depict only those layers that are useful to pilot orientation, avoiding excessive chart clutter.

8.2.1.3.2. Topographical charts created using GPD and the appropriate raster (CADRG) or GeoTiff (VFR sectional) product with the procedure plotted to correct scale meet this requirement.

8.2.1.3.3. Paper maps/charts are authorized for manually developed procedures. Do not send maps with overlays/transparencies taped to the map. Procedure segments should be drawn or traced directly on the chart.

8.2.1.3.4. Do not send a single map for multiple procedures.

8.2.1.3.5. Controlling obstacles must be identified and highlighted; these obstacles shall be identified so that they correlate to the controlling obstacles listed on approach or departure procedure build output of GPD and the map template. See **Figure 8.1.** for an example of the map template to be placed on the map.

Figure 8.1. Controlling Obstacle Map Template Example (approach procedure)

Airport ID:	**KVAD**	GPD Output Reference #	SEGMENT	OBSTRUCTION	MSL ELEV
Airport Name:	**Moody AFB**				
City:	**Valdosta**	**424**	**Initial**	**Tower**	**497**
State:	**Georgia**	**4666**	**Intermediate**	**Tower**	**498**
		353	**Final (ILS)**	**Trees**	**239**
Procedure ID:	**HI-ILS Rwy 36R**	**485**	**Final (LOC)**	**Antenna**	**340**
Amdt. #:		**417**	**Missed Apch**	**Trees**	**247**
Date Drawn:	**3/20/04**	**38**	**Circling A-E**	**Water Tower**	**411**
Scale:	**1:100,000**				

8.2.1.4. 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 the graphic produced by GPD. Procedure revision packages may include a copy of the existing NGA graphic with the changes added

(penned in), or a new GPD FLIP graphic depiction with the changes highlighted. RNAV (GPS) procedures shall have both the magnetic courses and true courses depicted in the plan and profile view. The true course shall be adjacent to the magnetic course in parenthesis, e.g.: (240T).

NOTE: The profile view must be added manually to the GPD build until GPD is capable of producing this view.

8.2.1.5. Each applicable FAA Form 8260-2, *Radio Fix and Holding Data Record.*

NOTE: 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."

8.2.1.6. FAA Form 6050-4, *Expanded Service Volume Request*, when applicable.

8.2.1.7. AF IMT 3980, *Waiver*, when applicable.

NOTE: When the procedure is new and HQ AFFSA has not approved a waiver, submit this IMT with Blocks 1-8 completed.

8.2.1.8. Any additional information that has relevance to the procedure that may aid in the flight inspection process.

8.2.2. Submit 2 copies of the procedure package to the flight inspection office not later than 10 duty days (14 duty days outside CONUS) prior to the scheduled/anticipated flight inspection date. One copy will remain with the flight inspection office and the other will be provided to the flight crew.

8.2.3. Contingency and/or short-notice flight inspections shall be coordinated as soon as possible between the MAJCOM or CFACC/JFACC (or equivalent) and the flight inspection office. Flight inspection of short-notice requirements in overseas theaters may be delayed or prohibited by timelines required to process country clearance and diplomatic visa requests. Earliest possible notification of potential flight inspection requirements will improve the flight inspection office's ability to respond. Flight inspection requests inside foreign clearance guide timelines will require MAJCOM/theater assistance to expedite clearance requests.

8.3. Flight Inspection of Special Use Instrument Procedures.

8.3.1. Special use procedures do not require flight inspection when all of the following conditions can be met to achieve an equivalent level of safety:

8.3.1.1. The special use procedure uses NAVAIDs that have been flight inspected according to AFMAN 11-225 or ICAO Annex 10.

NOTE: Not applicable to Airborne Radar Approach (ARA) procedures.

8.3.1.2. All segments (including holding) of the special use procedure are within the standard service volume and usable coverage of the NAVAIDs used.

NOTE: Not applicable to Airborne Radar Approach (ARA) and PAR procedures.

8.3.1.3. The special use procedure has received a flyability check that verifies the controlling obstacle in each segment of the procedure.

NOTE: The aircrew performing the flyability check must be briefed to accomplish this prior to the flyability check and the flyability check IMT must be annotated that this was completed satisfactorily.

8.3.1.4. The note "RADAR REQUIRED" is clearly indicated on the procedure.

NOTE: Aircraft using the special use procedure must be monitored by ATC radar throughout the entire procedure, to include missed approach and any holding.

8.3.2. When all the requirements of paragraph **8.3.1.** cannot be fulfilled, the procedure requires flight inspection prior to being used/published.

8.3.3. MAJCOM commanders or the JFACC/CFACC (or equivalent) may waive any of the conditions in paragraphs **8.3.1.1.** through **8.3.1.4.** without prior approval from HQ AFFSA when IMC use of the special use instrument procedure is essential due to a military emergency or an urgent military necessity. MAJCOMs or the JFACC/CFACC (or equivalent) will notify HQ AFFSA/XO/XOI of their intention to exercise this waiver option.

NOTE: Reference short-notice/contingency TERPS; when all requirements of paragraph **5.1.7.** are being applied and after notification in paragraph **8.3.3.** is made to AFFSA/XO/XOI, nonstandard instrument procedures may be used prior to AFFSA/CC review and approval. The TERPS OPR shall forward all required waiver documentation to AFFSA/XOI as soon as possible for AFFSA review and approval.

8.3.4. Flight inspection of special use procedures based on host nation source (FTIP) 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 criteria.

8.4. AF IMT 3992, Instrument Procedure Flyability Check, Instrument Approach Procedure (IAP). The instructions for this IMT are located in **Attachment 8**.

8.5. AF IMT 3993, Instrument Procedure Flyability Check, Departure Procedure (DP). The instructions for this IMT are located in **Attachment 8**.

Chapter 9

MINIMUM VECTORING ALTITUDE AND MINIMUM IFR ALTITUDE CHARTS

9.1. Minim Vectoring Altitude (MVA) Chart. The MVAC is used to determine the lowest useable IFR altitude at which an aircraft may be vectored and maintain clearance from obstructions/terrain and uncontrolled airspace in a radar environment. Develop and maintain MVACs as directed by ATC facility management, using the Chart Designer module of USAF Global Procedure Designer (GPD) software (see AFI 13-203 for MVAC applicability). After creating a new chart, but prior to sector design, review workspace and obstacle quality reports to identify and resolve issues relating to poor data quality. Compare ingested digital aeronautical data against source data (i.e. aerodrome/ASR location, ASR magnetic variation) and resolve discrepancies prior to chart development. Resolve all criteria violations identified by GPD or provide justification prior to export. Coordinate with ATC facility management and senior operational commander and document on AF IMT 4332, 20040301, V1 **ATC Chart Signature Page.** FAA/Host Nation signatures are only required when mandated by formal agreement. Forward MVAC packages to MAJCOM TERPS function for review and obtain approval prior to use. MVACs do not require flyability/flight inspection.

NOTE 1: Resolve data discrepancies prior to chart construction. Changes to ASR or chart center location made after chart construction will result in a condition where the chart cannot be restored.

NOTE 2: USAF locations with TERPS responsibility and where terminal radar service is provided by the FAA/host nation (i.e. USAF VFR tower) are not required to develop a MVAC, however they are required to obtain a copy of the FAA/host nation MVAC from the controlling facility for reference during instrument chart development. Locations that are required to develop MVACs are also required to obtain copies of the MVAC developed by adjacent ATC facilities and required to prevent excessive altitude changes between the two facility's adjoining MVA sectors.

9.1.1. Definitions and chart types.

9.1.1.1. Terminal MVAC. This chart supports those systems where radar data is provided by a feed from a single short range (terminal) ASR/DASR antenna. Develop terminal MVACs for legacy analog radars (GPN-12/GPN-20) and mobile ASRs (MPN-14/TPN-19), and DASR (GPN-30). They are also developed to support the designated terminal area of a multi-sensor 'mosaic' system when the area is adapted to exclusively utilize a single terminal radar. A terminal MVAC does not support a terminal 'mosaic' area where radar data is provided by more than one radar (ASR/DASR or ARSR) or a terminal area where controllers have the ability to switch from terminal to 'mosaic' mode. 3 NM lateral separation is provided from terrain and obstructions (sector buffer) within 40 NM of the ASR/DASR and 5 NM lateral separation is provided 40 NM or greater from the chart center. A terminal MVAC must be centered on the terminal ASR/DASR radar antenna in order for GPD to determine where to increase from 3 to 5 NM lateral separation.

9.1.1.2. Enroute MVAC. This chart supports those systems where radar data is provided by a feed from one or more long range (enroute) ARSR antennas, or a feed from more than one terminal radar. Develop enroute MVACs for multi-sensor 'mosaic' systems (MEARTS, STARs), except for the areas specified in paragraph **9.1.1.1.**. When a terminal MVAC is developed for the terminal area of a multi-sensor system, develop and maintain both terminal and enroute MVACs. Enroute MVACs are also required to provide backup for Center Radar Presentation (CENRAP) operations. 5 NM lateral separation is provided from terrain and obstructions (sector buffer) regardless of the

distance from the chart center/aerodrome. Chart center is not required to be at any set location, but is normally the center of assigned ATC airspace or the ARP of the primary airport. Enter into GPD Data Manager a 'pseudo' ASR radar (named 'chrt_ctr') at the desired location. Use the aerodrome magnetic variation as the ASR magnetic variation of 'chrt_ctr' when this option is used.

9.1.1.2.1. When CENRAP is utilized as a backup to a terminal system; separate terminal and enroute charts must also be developed.

9.1.1.2.2. Facility managers may elect to develop a single enroute chart to support both normal and CENRAP operations to reduce complexity.

9.1.1.3. Standard sector. A sector bounded by two bearings and two ranges (arcs) relative to chart center.

9.1.1.4. Irregular sector. A more complex sector bounded by more than two bearings and two ranges relative to chart center.

9.1.1.5. Prominent obstacle sector. An "all buffer" sector intended to provide 3 or 5 NM lateral separation from a single obstacle.

9.1.1.5.1. This sector type is only authorized to provide separation from an isolated, man-made obstacle that is significantly higher than surrounding terrain/obstructions (see **Figure 9.1.**).

9.1.1.5.2. Prominent obstacle sectors cannot be used to provide separation from terrain features such as mountain peaks, since both obstacles and terrain are excluded from the determination of the minimum altitude of the sector(s) surrounding or adjoining the prominent obstacle sector (see **Figure 9.2.**).

9.1.1.5.3. This sector type is not authorized when the highest terrain in the prominent obstacle sector is greater than the MVA minus applicable ROC of the surrounding/adjoining non-prominent obstacle sector(s).

9.1.1.5.4. This sector type is not authorized when the minimum altitude based on the highest obstacle/terrain in the sector is greater than the MSL height of the selected obstacle + vertical accuracy (Obstacle Effective Height) + applicable ROC.

NOTE: GPD will not prevent misapplication of the above (paragraphs **9.1.1.5.1.** through **9.1.1.5.4.**).

9.1.1.6. Polygonal sector. A sector defined by the WGS-84 coordinates of each corner (vertex). There is no limit to the number of sides to this type sector.

Figure 9.1. Correct Application of Prominent Obstacle Sector.

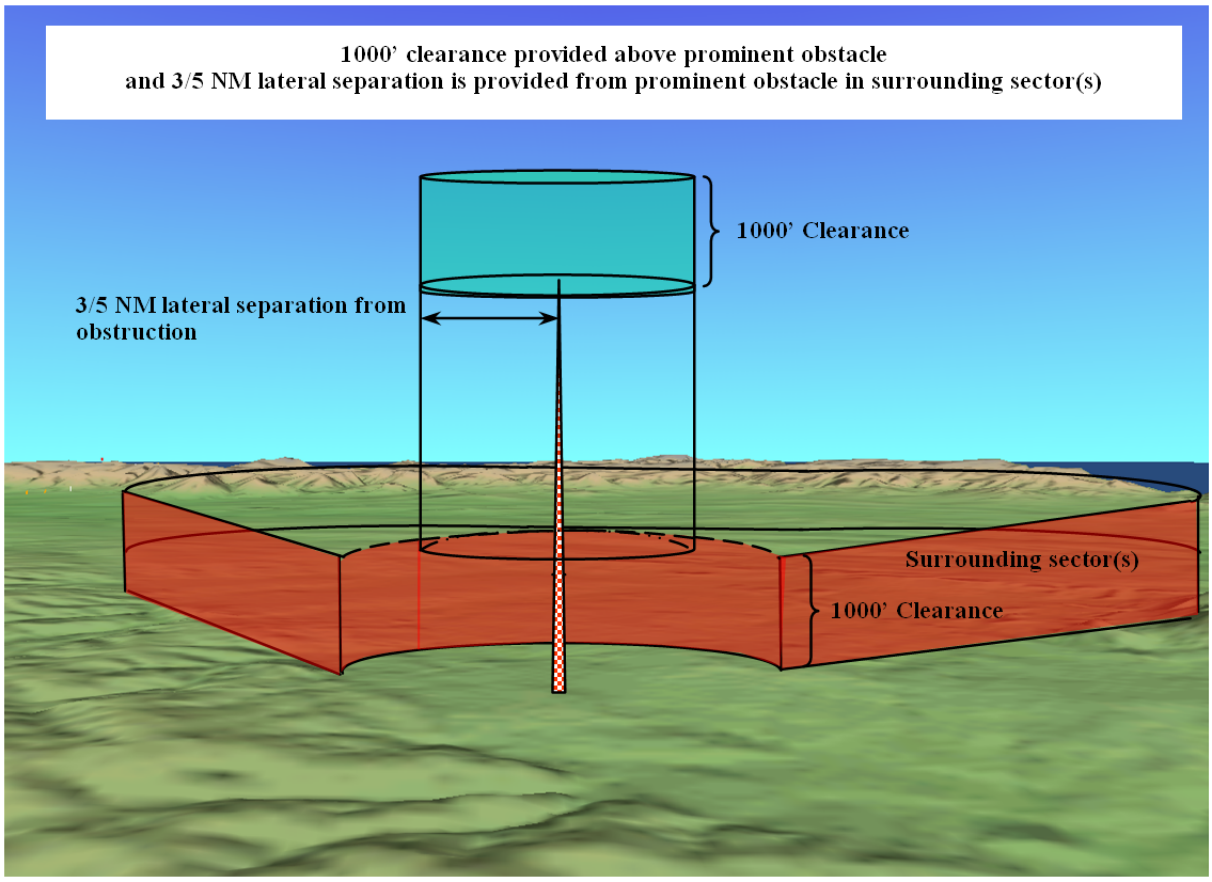
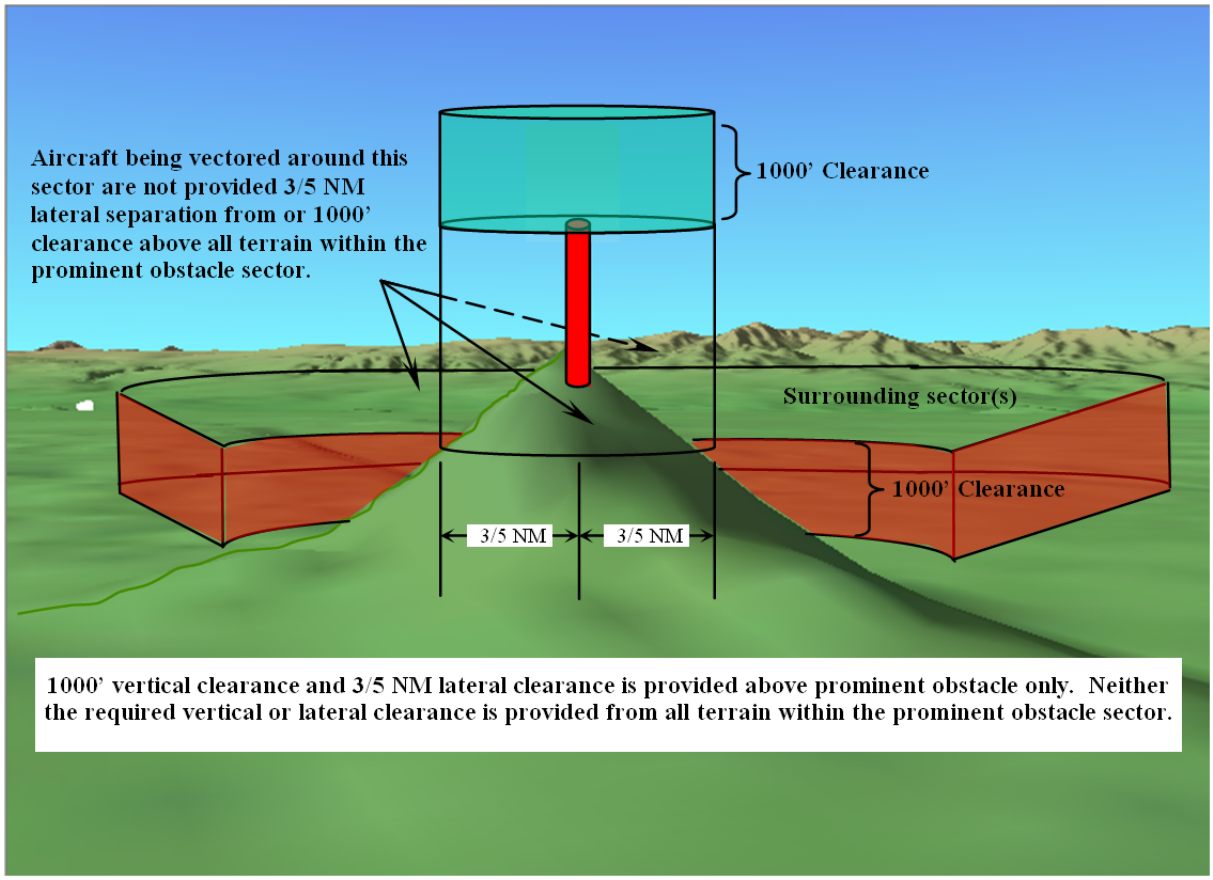


Figure 9.2. Incorrect Application of Prominent Obstacle Sector.



9.1.2. Chart design.

9.1.2.1. Determine which type chart (Terminal/Enroute/both) is applicable based on paragraph **9.1.1.**.

NOTE: Establish MVACs without respect to normal primary radar coverage in the area considered for obstacle clearance. It is ATC's responsibility to determine whether or not target strength is adequate for radar control. It is not relevant to MVAC development whether radar service in a specific area is provided using primary or secondary radar.

9.1.2.1.1. For a Terminal MVAC, the area considered for obstacle clearance (chart radius) shall extend to the maximum range of the ASR radar and be large enough to include all delegated airspace to include adjacent areas where control responsibility is assumed because of early handoff or track initiation. EXCEPTION: When developing a Terminal MVAC to support the designated terminal area of a multi-sensor system (see paragraph **9.1.1.1.**), the area must only be large enough to include the entire terminal area to include the appropriate buffer area based on the distance from the ASR/DASR.

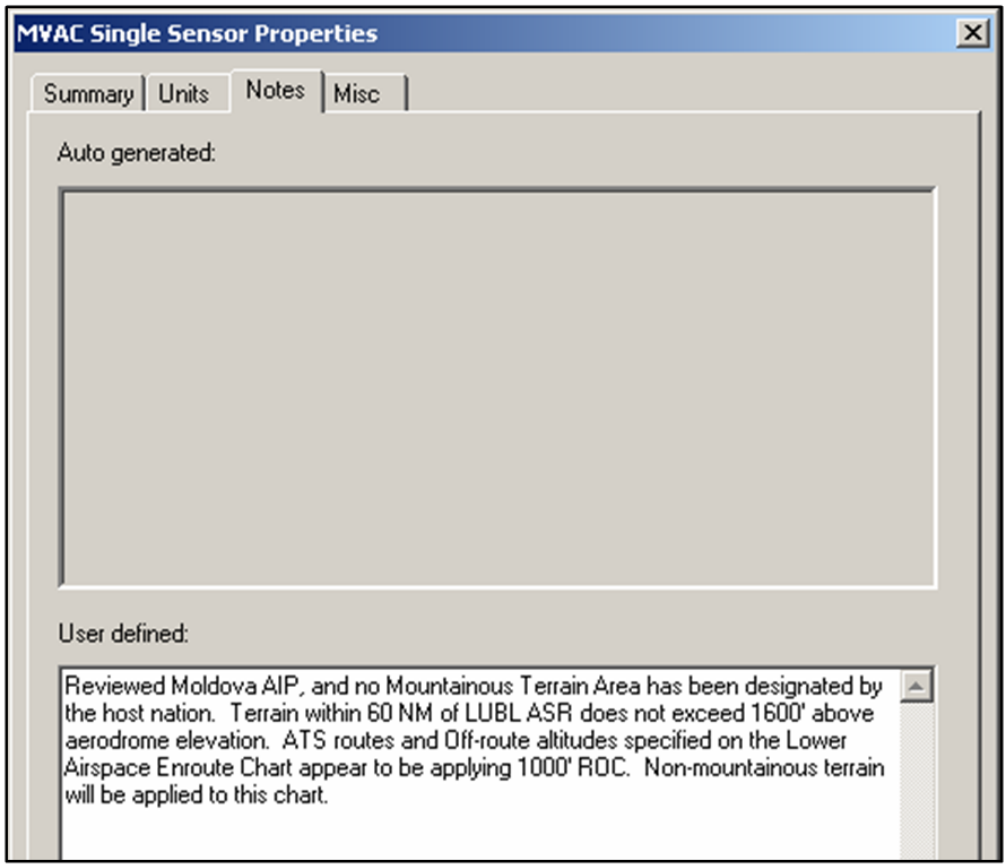
9.1.2.1.2. For an Enroute MVAC, the area considered for obstacle clearance (chart radius) shall be large enough to include 20 NM beyond delegated airspace boundaries to include adjacent areas where control responsibility is assumed because of early handoff or track initiation.

NOTE: When developing an Enroute MVAC, ensure that "Radar has CENRAP display" is selected in the chart properties of GPD regardless of whether or not the chart is being developed for CENRAP operations to ensure the proper buffer size is constructed.

9.1.2.2. To aid in determining the appropriate chart radius, delegated ATC airspace may be entered into GPD Data Manager as a new, unclassified airspace. Provide the airspace a meaningful name (i.e. XXXX approach airspace) and display this airspace during chart development (see GPD Operators Manual, Vol. 1, paragraph 13.11.2). Ensure the coordinates for the airspace are entered in the WGS-84 datum. Delegated airspace parameters are usually detailed in the RAPCON/ARTCC agreements. Provide this delegated airspace data to the MAJCOM TERPS function to aid in review and approval of the chart.

9.1.2.3. Define the chart properties. Specify whether the default terrain type for the chart is designated mountainous or non-mountainous IAW Subpart B of 14 CFR Part 95 in the CONUS. OCONUS, review the appropriate host nation AIP and/or other applicable directives and comply with mountainous terrain designations. When the host nation has not explicitly defined terrain type designations, evaluate the topography of the area to determine if it is equivalent to designated mountainous areas in CONUS. Additionally, check enroute charts (host and NGA) to ascertain the ROC applied on ATS routes and to off-route altitudes (i.e. MORA/OROCA). Make a determination which terrain type is appropriate and document the rationale in the chart's user defined notes (see **Figure 9.3.**).

Figure 9.3. User Defined Note Annotating Mountainous Terrain Designation.



9.1.2.3.1. When non-mountainous terrain is specified, GPD will default to 1000’ ROC for all new sectors. When mountainous terrain is specified, 2000’ ROC will be applied as the system default.

9.1.2.3.2. Where lower altitudes are required in designated mountainous areas to achieve compatibility with terminal routes or to permit vectoring to an instrument approach, the default ROC may be reduced to 1000’ for a Terminal MVAC, and 1500’/1700’ for an Enroute MVAC as specified in FAA Order 8260.19, paragraph 363, and FAA Order 8260.3, paragraphs 1720b(1) and (2).

9.1.2.4. Specify the appropriate allowance for trees based on documented maximum tree height for the area.

NOTE: This allowance will be applied uniformly to the entire terrain model. In areas without widespread vegetation, areas where the maximum tree height varies significantly from one part of the chart to another, or when Shuttle Radar Topography Mission (SRTM) data is used, it may be more appropriate to specify sector altitudes that ensure clearance above terrain + known tree height and document the application of this process in the user defined notes.

9.1.3. Sector Design.

9.1.3.1. Make each obstacle sector (except for prominent obstacle sectors) large enough to permit the efficient and safe vectoring of aircraft. Consideration should be given to aircraft performance and phase of flight.

9.1.3.2. Specify standard, irregular, or polygonal sectors or any combination thereof based on the terrain/obstacle and airspace environment or other operational requirements (radar patterns, noise abatement areas, SUA, etc.). Ensure sector coverage over the entire chart with no gaps between sectors. With the exception of a prominent obstacle sector, each sector's boundary should adjoin (but not overlap) the boundary of each adjacent sector. In some cases it may be desirable to combine adjacent smaller areas having different altitudes into a single large area with one altitude. See **Figure 9.7.** and **Figure 9.8.**.

NOTE: There is no limitation to what sector types may be developed for either a terminal or enroute MVAC. For example, polygonal sectors can be established for a terminal chart, and standard sectors can be defined for enroute. However, when MVAC sector design impacts MSAW, consider low altitude alerting development limitations (for example, MEARTS MSAW sectors can only be defined as convex polygons; PIDP MSAW sectors can only be defined as range/bearing). Coordinate with ATC automation personnel when applicable to determine optimum sector design. MVAC sector design has no bearing on STARS MSAW.

9.1.3.3. When a single, isolated, man-made obstacle causes the entire sector altitude to be higher than desired, a prominent obstacle sector may be established (see paragraph **9.1.1.5.**). A prominent obstacle sector may overlap another sector or adjacent sectors.

9.1.3.4. Specify sector altitudes no less than the minimum altitude. The selected altitude shall provide at least the required ROC above obstructions and terrain + vegetation allowance in the sector (including buffer) and must be at least 300 feet above the highest floor of controlled airspace in the sector (not including buffer), rounded to the higher 100’ increment. Annotate each sector where paragraph **9.1.2.3.2.** is applied with the statement "ROC reduced to less than 2000’”.

NOTE 1: Floor of controlled airspace in mountainous areas or sparsely populated areas, may be as high as 14,500 feet MSL. When the minimum altitude is higher than desired due to a high floor of uncontrolled (Class G) airspace, and when operationally required by ATC (i.e. routinely expected to vector aircraft in Class G), two sector altitudes may be established. One sector altitude shall be based on the floor of controlled airspace and the second based on obstruction clearance.

NOTE 2: The terrain used for floor of controlled airspace determination does not include the vegetation allowance.

9.1.3.4.1. In CONUS, display the applicable NACO Digital VFR sectional in order to determine the highest floor of controlled airspace. Digital VFR sectionals are in a geo-referenced tagged image format. In order for them to display correctly, GPD display parameters must be changed to match the spatial reference attributes.

9.1.3.4.1.1. Open the HTML document associated with the VFR sectional of interest and find the spatial reference information (see **Figure 9.4.**). Note that all geodetic coordinates must be converted from decimal degrees to DDMMSS.SS (decimal seconds) format.

9.1.3.4.1.2. In GPD chart designer, select "View" from the dropdown menu, and click on "Display Parameters" (see **Figure 9.5.**).

9.1.3.4.1.2.1. In the "Datum" field, enter the Horizontal_Datum_Name from the Geodetic model section of the HTML file.

9.1.3.4.1.2.2. In the "Projection" field, enter the Map_Projection_Name from the Map_Projection section of the HTML file. DO NOT select the "Geodetic" check box.

9.1.3.4.1.2.3. In the "Central Meridian" field enter the Longitude_of_Central_Meridian from the Map_Projection section of the HTML file.

9.1.3.4.1.2.4. In the "Origin Latitude" field, enter the Latitude_of_Projection_Origin from the Map_Projection section of the HTML file.

9.1.3.4.1.2.5. In the "1st Std Parallel" field, enter the first (top) Standard_Parallel from the Map_Projection section of the HTML file.

9.1.3.4.1.2.6. In the "2nd Std. Parallel" field, enter the second (bottom) Standard_Parallel from the Map_Projection section of the HTML file.

9.1.3.4.1.2.7. Also enter False Easting and False Northing when applicable (usually 0). No other fields require changes.

9.1.3.4.1.2.8. After the display parameters are set by clicking "OK", again select "View" from the dropdown. Click on "GeoTIFF" and open the appropriate file VFR sectional file (see **Figure 9.6.**). Note that it may be necessary to repeat the steps in paragraph **9.1.3.4.1.2.** when the MVAC overlies more than one VFR sectional map.

NOTE: This geo-reference process for VFR Sectionals will be automatic in a future release of GPD.

Figure 9.4. Digital VFR Sectional Spatial Reference Information.

Spatial_Reference_Information:
- *Horizontal_Coordinate_System_Definition:*
  - *Planar:*
    - *Map_Projection:*
      - *Map_Projection_Name:* Lambert Conformal Conic
      - *Lambert_Conformal_Conic:*
        - *Standard_Parallel:* 46.666670
        - *Standard_Parallel:* 41.333330
        - *Longitude_of_Central_Meridian:* -112.816670
        - *Latitude_of_Projection_Origin:* 42.300000
        - *False_Easting:* 0.000000
        - *False_Northing:* 0.000000
    - *Planar_Coordinate_Information:*
      - *Planar_Coordinate_Encoding_Method:* row and column
      - *Coordinate_Representation:*
        - *Abscissa_Resolution:* 63.870931
        - *Ordinate_Resolution:* 63.870931
      - *Planar_Distance_Units:* meters
  - *Geodetic_Model:*
    - *Horizontal_Datum_Name:* North American Datum of 1983
    - *Ellipsoid_Name:* Geodetic Reference System 80
    - *Semi-major_Axis:* 6378137.000000
    - *Denominator_of_Flattening_Ratio:* 298.257222

9.1.3.4.2. When digital products are not available to assist in determining the floor of controlled airspace, use the following alternative method. After all sectors are designed but before finalizing sector altitudes, *plot* (not *print*) the chart to the appropriate map scale on clear film (1:500,000 for VFR sectional). Ensure the map grid is on and the map projection/geodetic datum are correctly set. Overlay the clear film on the appropriate hard-copy VFR sectional or host nation equivalent map/chart in order to determine the highest floor of controlled airspace in each sector (not including the sector buffer). Enter the correct floor of controlled airspace for each sector in GPD Chart Designer. Note that some sectors may need to be redesigned in order to achieve the desired vectoring altitude.

9.1.3.4.3. DAFIF-derived airspaces (Class A thru E and SUA) may also be displayed in addition to VFR sectionals, however the controlled airspaces from DAFIF are not comprehensive and should not be used as the sole source for determining the floor of controlled airspace in CONUS.

9.1.3.4.4. Host nations may detail floor of controlled airspace in their AIPs or other sources, however some compute this data differently than US criteria. Check with appropriate host nation personnel to ensure accurate information is applied. When a host nation does not designate the floor of controlled airspace, controlled airspace shall be considered to begin at the surface. Document in the chart's user defined notes and, when available, include a hard copy version of the host nation's airspace description in the Chart package.

Figure 9.5. GPD Display Parameters Dialogue.

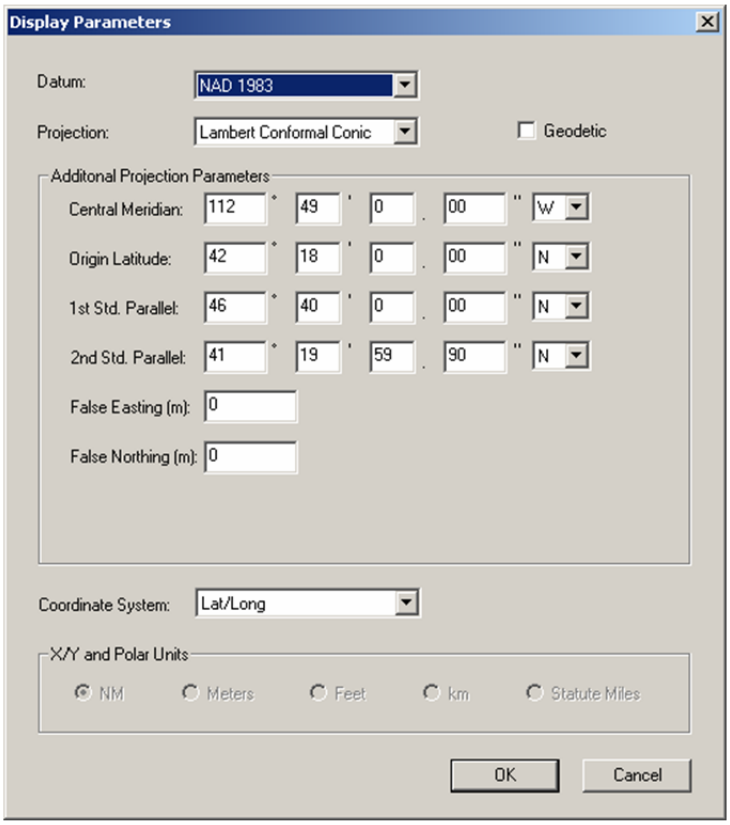


Figure 9.6. MVAC Sectors in GPD Chart Designer with VFR Sectional and ATC Delegated Airspace.

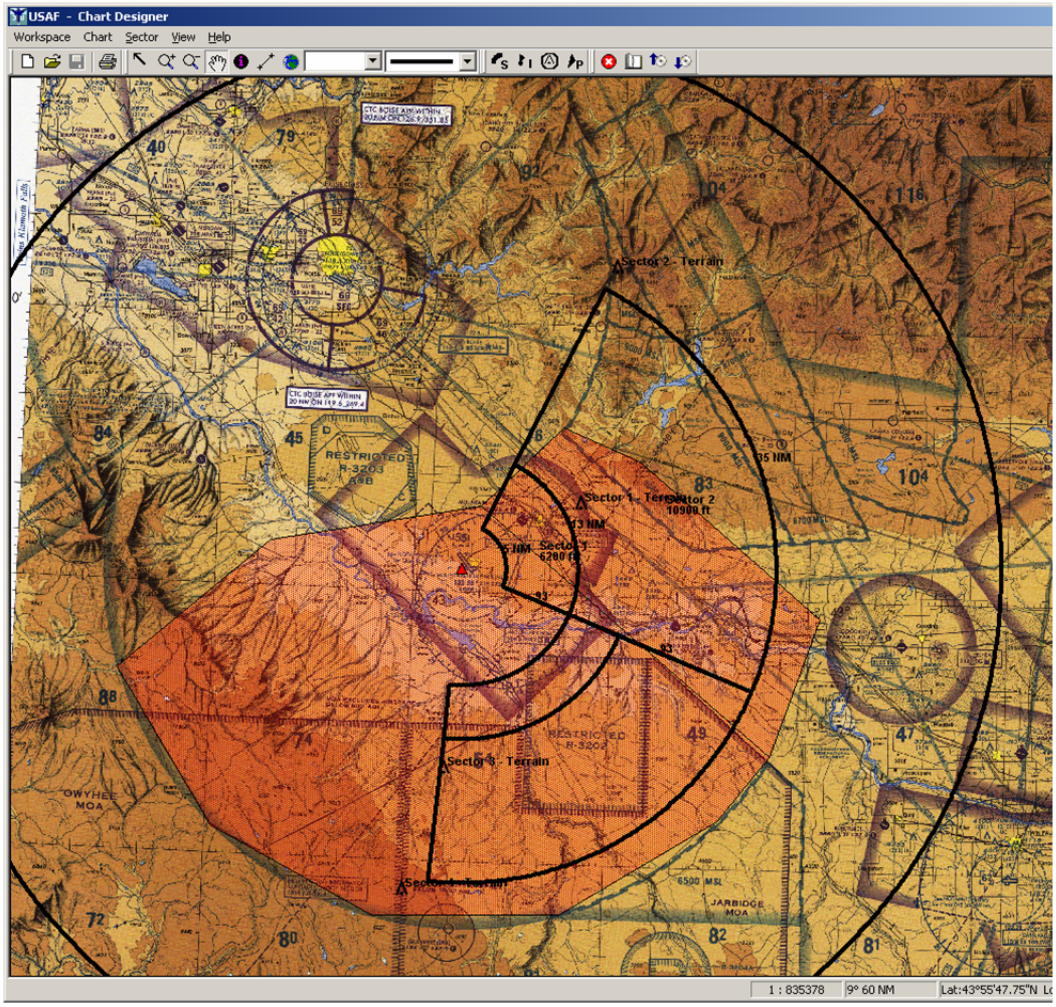


Figure 9.7. Minimum Vectoring Altitude Chart Standard/Irregular/Polygonal/Prominent Obstacle Sectors.

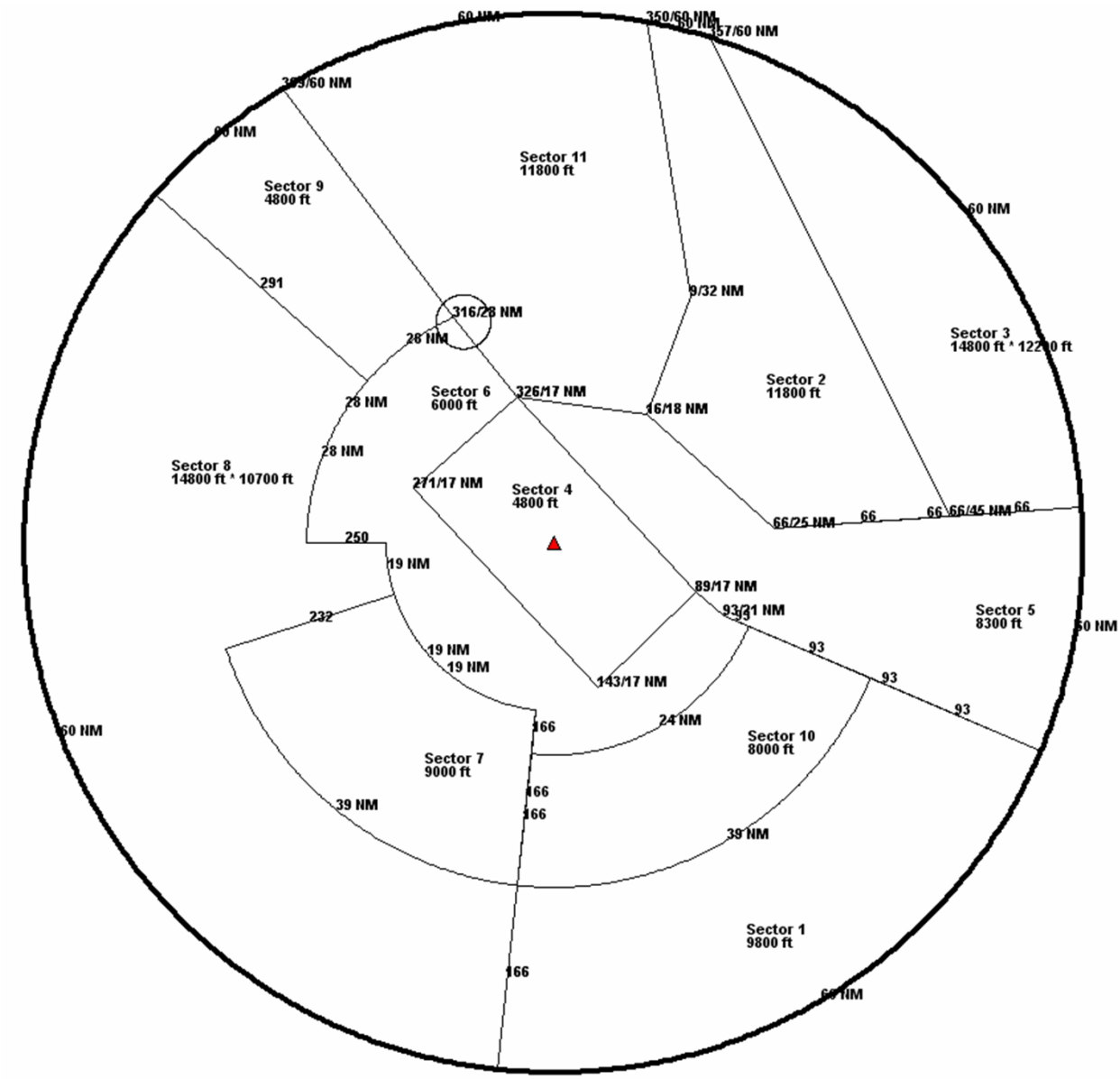
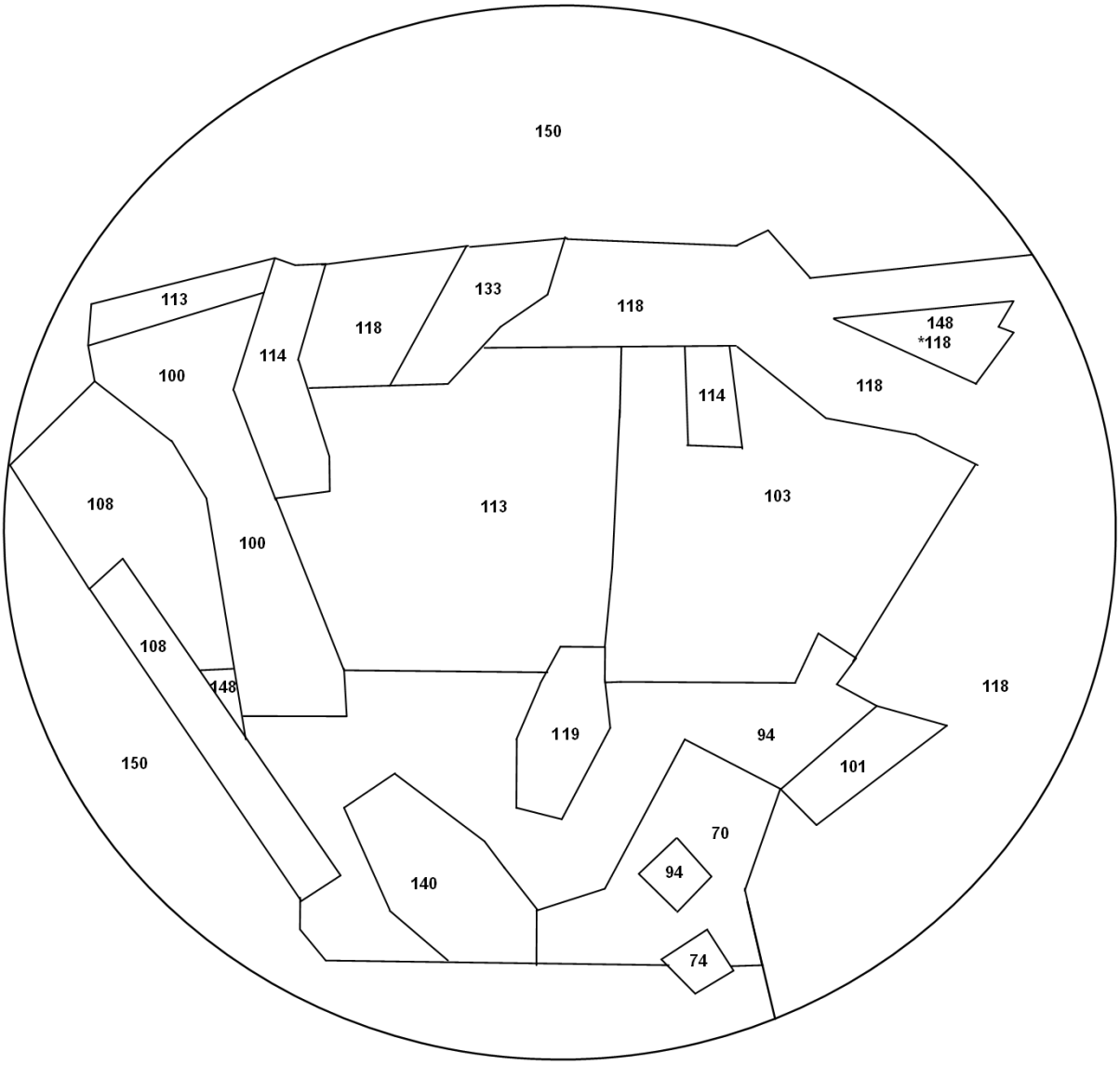


Figure 9.8. Minimum Vectoring Altitude Chart with Polygonal Sectors.



9.2. Minimum Instrument Flight Rules Altitude Chart (MIFRAC). The MIFRAC is used to determine the lowest useable IFR altitude at which an aircraft may operate, receive the appropriate NAVAID, and maintain clearance from obstructions/terrain and uncontrolled airspace in a non-radar environment. Develop and maintain MIFRACs as directed by ATC facility management, using the Chart Designer module of GPD software (see AFI 13-203 for MIFRAC applicability). After creating a new chart, but prior to sector design, review workspace and obstacle quality reports to identify and resolve issues relating to poor data quality. Compare ingested aeronautical data against source data (i.e. aerodrome/facility location, facility magnetic variation, etc.) and resolve discrepancies prior to chart development. Resolve all criteria violations identified by GPD or provide justification prior to export. Coordinate with ATC facility management and senior operational commander and document on AF IMT 4332, 20040301, V1 **ATC Chart Signature Page.** FAA/Host Nation signatures are only required when mandated by formal agreement.

Forward MIFRAC packages to MAJCOM TERPS function for review and obtain approval prior to use. MIFRACs do not require a flyability check or a flight inspection.

NOTE 1: Resolve data discrepancies prior to chart construction. Changes to facility location made after chart construction will result in a condition where the chart cannot be restored.

NOTE 2: Minimum IFR altitudes are separate and distinct from established minimum enroute altitudes on published IFR airways/routes and are only intended for off-route and direct-route operations. The MEA/MOCA in a particular area has no impact on MIFRAC design.

9.2.1. Chart Design. Develop a MIFRAC centered on each omni-directional NAVAID (TACAN, VORTAC, VOR or NDB) in the workspace used for non-radar operations where the distance from the facility to the supported aerodrome is less than or equal to the operational service volume of the NAVAID (see FAA Order 8260.19, para. 208b). The area considered for obstacle clearance (chart radius) must be large enough to encompass the standard NAVAID service volume for the highest altitude where control responsibility is routinely assumed.

NOTE: The existence of an expanded service volume has no bearing on MIFRAC design unless approved for an entire area/sector in which off-route operations are conducted. Normally, ESVs are approved only for a specific fix associated with an instrument procedure.

9.2.1.1. Specify the default terrain type IAW paragraph **9.1.2.3.** and the vegetation allowance IAW paragraph **9.1.2.4.**.

9.2.1.2. MIFRACs must be associated with a MVAC in the chart properties unless operationally necessary (i.e. only non-radar operations are conducted). Develop the MVAC IAW paragraph **9.1.** and save. When defining the MIFRAC properties, associate the new MIFRAC with the saved MVAC.

9.2.2. Sector Design. Chart sectors should be as simple as possible and large enough to permit efficient traffic flow in a non-radar environment. Consideration should be given to aircraft performance and phase of flight.

9.2.2.1. Specify standard or irregular sectors or any combination thereof based on the terrain, obstacle, and airspace environment; MVAC; and/or other operational requirements (radar patterns, noise abatement areas, SUA). Ensure sector coverage over the entire chart with no gaps between sectors. Each sector's boundary should adjoin (but not overlap) the boundary of each adjacent sector. In some cases it may be desirable to combine adjacent smaller areas having different altitudes into a single large area with one altitude (see **Figure 9.10.**).

NOTE: There is no "Terminal" or "Enroute" distinction for MIFRACs; 5 NM lateral separation (buffer area) is provided from terrain and obstructions regardless of the distance to the facility.

9.2.2.2. Specify sector altitudes no less than the minimum altitude. This minimum altitude shall provide at least the required ROC above obstructions and terrain + vegetation allowance in the sector (including buffer) and must be at least 300 feet above the highest floor of controlled airspace in the sector (not including buffer), rounded to the higher 100' increment. Selected sector altitude shall not be lower than the MVA for that given area. **CAUTION:** Two or more MVA altitudes may affect a single MIFRAC sector. Annotate each sector where paragraph **9.1.2.3.2.** is applied with the statement "ROC reduced to less than 2000" (see **Figure 9.11.**).

NOTE: Display the applicable NACO Digital VFR sectional in order to determine the highest floor of controlled airspace in each sector IAW paragraph **9.1.3.4.1.**

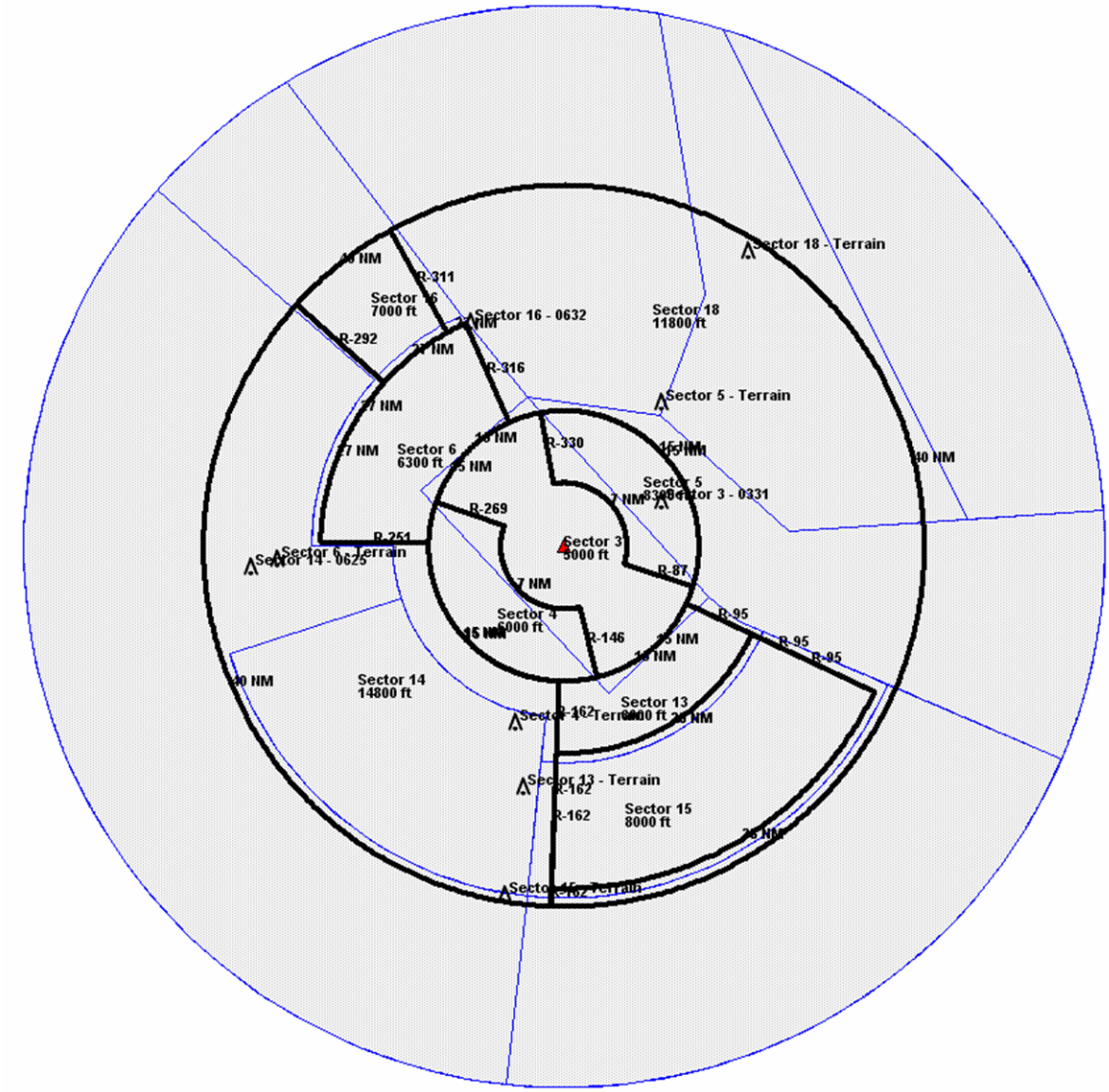
9.2.2.3. Consider restrictions noted on flight inspection reports or ASIS datasheet (i.e. horizontal/vertical NAVAID limitations to include unusable sectors) when determining sector design and when specifying sector altitudes (see **Figure 9.9.**). For example, for the first restriction shown in **Figure 9.9.**, the MIFRAC sector from R-130 clockwise to R-160 beyond 29 NM out to the chart radius shall not be lower than 9000 MSL regardless of the minimum altitude specified by GPD. When flight inspection designates that no coverage exists in an area, annotate the sector as unusable.

Figure 9.9. NAVAID Restrictions.

*** RESTRICTION ***							
Cmpnt	Qual	Svc Date	From	To	Byd	Below	Remark
TACAN	BOTH	08/19/93	130	160	29	9000	
TACAN	BOTH	08/19/93	235	305	19	8000	
TACAN	BOTH	02/02/96	235	305	27	12000	

Figure 9.10. MIFRAC Sectors in GPD Chart Designer with VFR Sectional.

Figure 9.11. MIFRAC Sectors in GPD Chart Designer with MVAC (in blue).



9.3. Chart Documentation and Processing. Create and maintain a procedure package folder containing documentation as follows:

9.3.1. Required hard copy (paper) documentation includes the computer generated MVAC or MIFRAC Report and AF IMT 4332, 20040301,V1 **ATC Chart Signature Page.**

NOTE: GPD will also output hard copy Obstacle Quality and Workspace Quality Reports, however these are intended to assist in aeronautical data resolution. Maintaining hard copies of these outputs is not required.

9.3.2. Also include all hard copy source documentation relating to aeronautical or obstacle data revisions pertinent to the chart to include hard copy correspondence to MAJCOM TERPS function.

9.3.3. Required soft copy (electronic) documentation includes the entire contents of the export folder to include the following files:

9.3.3.1. [workspace name].wks

9.3.3.2. [workspace name].xml

9.3.3.3. [chart name].dbf

9.3.3.4. [chart name].pdf

9.3.3.5. [chart name].shp

9.3.3.6. [chart name].shx

9.3.3.7. [chart name].xml

9.3.3.8. [chart name]-[date]-DEF.ipd

9.3.3.9. [chart name]-[date]-DEF.txt

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

9.3.3.11. [chart name]-Waiver.pdf (when applicable)

9.3.3.12. Expanded Service Volume Request.pdf. The blank IMT is not required to be included in the electronic package, but is mandatory when completed (see paragraph **9.2.1.**, Note)

NOTE: During chart export, GPD will prompt the user for a "save to" location for the electronic files. The default is to the drive containing the USAFIPD directory in the "export" folder under the specific chart name. Ensure all required electronic files are selected prior to export and save to the workstation's hard drive.

9.3.3.13. In addition to GPD produced export files, include additional electronic documentation (to include scanned versions of hard copies) relating to aeronautical or obstacle data revisions pertinent to the chart, along with correspondence to MAJCOM TERPS function.

NOTE: Only the signature page (AF IMT 4332, 20040301, V1 ATC Chart Signature Page) must be scanned and saved to electronic media, not the entire Chart Report.

9.3.4. Coordination.

9.3.4.1. Prior to submitting to the MAJCOM TERPS function for review and approval (see paragraph **9.1.** and paragraph **9.2.**), obtain required signatures on the hard copy IMT. Scan and add completed IMT to electronic documentation files.

9.3.4.2. "Zip" all electronic files and upload to the AFFSA FTP site in the appropriate MAJCOM directory under "Uploads" in the "Pending Review" folder. Follow up with an email or phone call to the MAJCOM TERPS function indicating a new file has been uploaded.

9.3.4.3. The MAJCOM TERPS function shall download the zipped "export" files and review the manual edits documented in the export package. When justification/source documentation is adequate, make necessary changes to aeronautical data and/or import manual obstacle changes from the [chart name]-OBS.txt file into GPD prior to chart import. When aeronautical data revisions are appropriate, coordinate with the AFFSA GPD help desk to initiate DAFIF correction.

CAUTION: Following the workflow in this order is necessary to correctly restore the chart (see paragraph **9.1.** Note 1 and paragraph **9.2.** Note 1).

9.3.4.3.1. Import the chart to complete the review process. Ensure that the date/time stamp associated with each page of the exported Chart Report is consistent with the date/time stamp associated with the imported chart. Review chart/sector construction and specified altitudes for compliance, and ensure sector coverage is appropriate (no gaps or overlaps).

NOTE: Validate chart violations and system generated notes against the exported Chart Report file ([chart name].pdf) instead of opening the report from the restored chart in GPD. When the restored chart has violations not included in the exported report, it is likely due to differences in the aeronautical or obstacle data maintained by the export workstation and that on the import workstation. Ensure currency of DAFIF/DVOF and recheck for manual revisions.

9.3.4.3.2. When approving a chart, print the hardcopy AF IMT 4332, 20040301, V1 **ATC Chart Signature Page** included in the export package and sign in the MAJCOM TERPS block. Scan, and add the electronic file to the list of files in the export package. Save an electronic copy of the entire package to removable electronic media for the MAJCOM archives. "Zip" the package and upload to the AFFSA FTP site in the appropriate MAJCOM directory under "Uploads" in the "Review Complete" folder. Follow up with an email or phone call to the unit indicating a new file has been uploaded.

9.4. DELETED.

Chapter 10

MOBILE MICROWAVE LANDING SYSTEMS

10.1. Category I Microwave Landing System (MLS). Develop MMLS procedures using the criteria in AFMAN 11-226(I), Volume 3.

10.2. Mobile Microwave Landing System (MMLS). The minimum glideslope angle should be 3°. The maximum authorized glideslope angle is 6.40°. Angles above 3.60° shall not be established without HQ AFFSA/XOIP approval.

10.2.1. The following definitions apply:

10.2.1.1. MMLS Datum Point. A point on runway centerline, 90 degrees abeam the MMLS elevation station (same as runway crown point for ILS procedures).

10.2.1.2. Elevation Antenna Emplacement Point.

10.2.1.2.1. *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).*

10.2.1.2.2. *All others. 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).*

10.2.1.3. Service Limitation. The azimuth service limitation is 15 miles from the facility, within ± 40½ of the center course. The elevation service limitation is 15 miles from the facility and from 2.5° to 15° (see **Figure 10.1.**).

10.2.2. MMLS Approach Minimums:

10.2.2.1. MMLS Category I. A precision approach procedure with a Decision Altitude (DA) of not less than 200 feet above TDZE.

10.2.2.2. MMLS Category II & III. Reserved.

10.2.2.3. Azimuth Only. Reserved.

10.2.2.4. 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 **10.2.5.** Note. Computed MMLS requires special aircraft avionics and may not support normal civil operations.

10.2.3. System Components. The system components are considered to be the MMLS Azimuth, Elevation, and DME.

NOTE 1: An additional conventional NAVAID may be used to conduct the instrument procedure i.e., missed approach or initial segment, however it is not considered to be a 'system component'. The MMLS does not provide back course azimuth. Course guidance used beyond MAP shall be based on another source.

NOTE 2: 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 ident.

10.2.4. Fixes. All fixes established within the MMLS coverage area shall be based on MMLS DME. Additionally, the following criteria applies:

10.2.4.1. MMLS DME fix error is ± 0.5 miles.

10.2.4.2. Published MMLS fix distances shall be specified to the nearest tenth of a mile.

10.2.4.3. Establish the PFAF by MMLS DME and publish the distance from the DME antenna.

10.2.5. Inoperative System Components. 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 glideslope off/warning flags and loss of course information. At split sites a failure of any component also renders the procedure unusable.

NOTE: 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. When this option is exercised, ensure the appropriate obstacle search areas are evaluated (different fix error involved in identifying a PFAF from another NAVAID). When this is not possible, a precision approach may be flown provided there is another means of identifying the PFAF such as RADAR.

10.2.6. On assault landing strips/zones (see Engineering Technical Letter [ETL] 04-7: C-130 and C-17 Landing Zone (LZ) Dimensional, Marking, and Lighting Criteria), the MMLS will be sited to provide touchdown 300 to 500 feet from threshold. Because of this limitation, the Threshold Crossing Height (TCH) and Wheel Crossing Height (WCH) may be less than normally authorized for a specific aircraft height group. When developing MMLS procedures supporting assault strips/LZs, the minimum TCH is 30’ regardless of aircraft height group. A TCH of less than 30’ or greater than 60’ is nonstandard and requires waiver processing. WCH violations for assault strips do not require a waiver. When this option is exercised, the procedure is ‘special use’ and paragraph **5.8.** applies. Annotate the procedure ‘NOT FOR CIVIL USE’ and include a note stating the nonstandard WCH condition (i.e. Group 4 WCH 17’).

10.2.7. Threshold Crossing Height (TCH). TCH will vary based on deployment configuration and system siting requirements. The optimum threshold crossing height is 50 feet keeping in mind that VGSI coincidence should be a primary consideration. Except as specified in paragraph **10.2.6.**, AFMAN 11-226(I) Vol 3, paragraph 2.6 and table 2-3 applies.

10.2.8. Procedure Design Limitations. Development of MMLS procedures shall be independent of existing procedures. Only straight-in procedures are authorized. Curved or angled procedures are not permitted.

10.2.9. Missed Approach. Do not use MMLS for missed approach course guidance.

NOTE: MMLS DME can be used in the missed approach segment not to exceed the service volume. When radar is used for the missed approach, annotate the procedure "RADAR REQUIRED".

10.3. DELETED.

Figure 10.1. Operational Limits of MMLS (drawing not to scale)

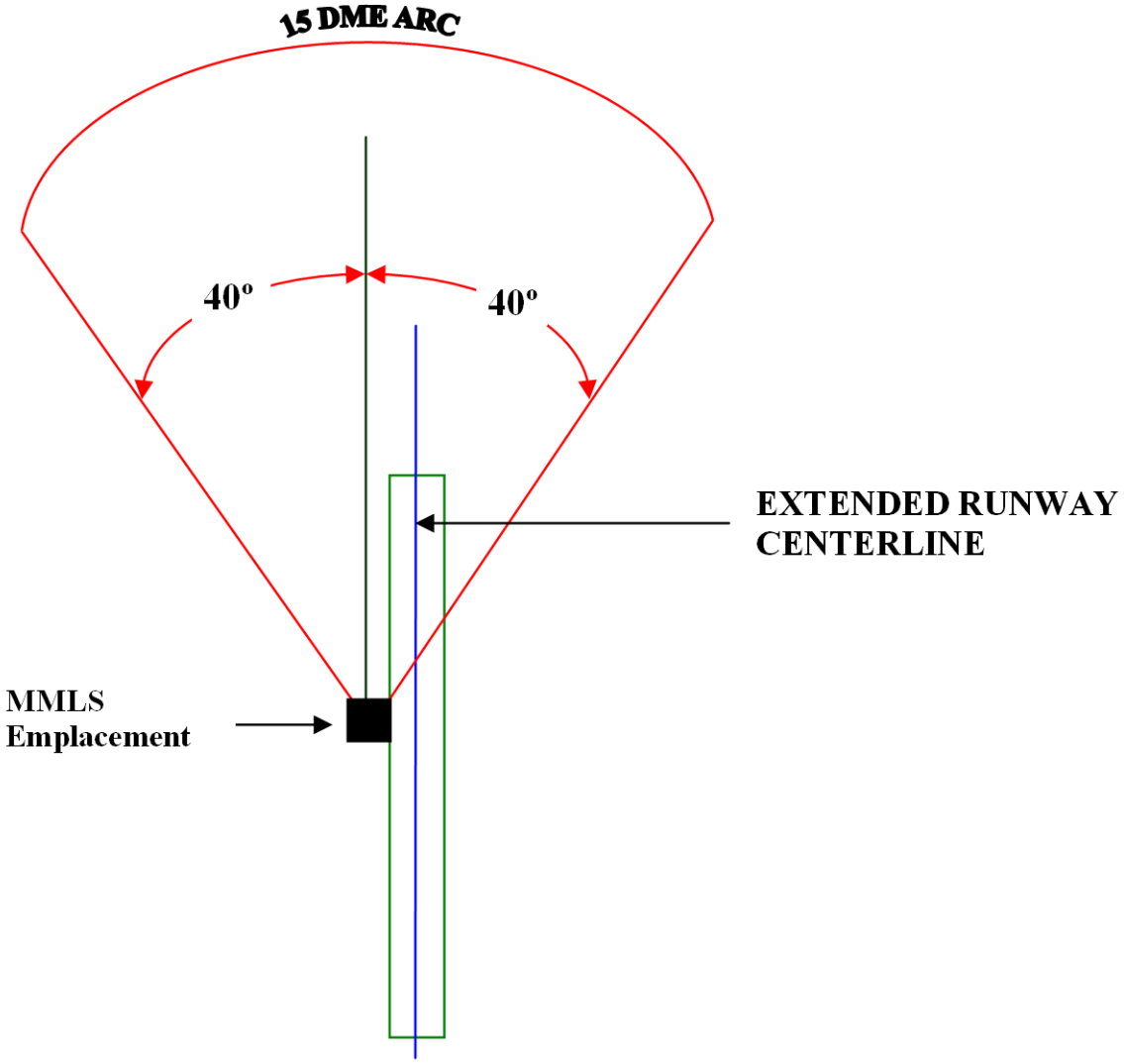


Table 10.1. DELETED.

Table 10.2. DELETED.

Table 10.3. DELETED.

Chapter 11

TERPS AUTOMATION

11.1. Authorized Software. Global Procedure Designer (USAF GPD) is the only TERPS software authorized for use when automating new procedures/charts for publication or review. It shall be utilized in lieu of other evaluation methods when USAF GPD has the capability to develop (in whole or in part) a procedure/chart type unless otherwise directed by AFFSA. Legacy AFTERPS version 12.03 software may only be used to maintain published procedures or active reviews that have not been re-automated using USAF GPD and only for the duration of the USAF GPD transition.

11.1.1. Computer Aided Drafting (CAD) (i.e. AutoCAD®, MicroStation®) or CAD-based applications are not recognized TERPS automation software and may not be used as such. They may however be used as an alternative to mechanical drafting with the following restrictions:

11.1.1.1. CAD shall not be used as an alternative to a full automated evaluation when the procedure/chart type (or portions thereof) is supported by USAF GPD.

11.1.1.2. CAD may be used to depict the 2-D assessment area for a segment/sector, but shall not be used for evaluation of the 3-D TERPS obstacle clearance surfaces with the intent of determining minimums, fix crossing altitudes, and/or minimum segment altitudes.

NOTE: CAD drawings of TERPS procedure segments/sectors require manual validation, on paper maps, in the same manner as those produced by mechanical drafting.

11.1.2. Self-calculating spreadsheets (i.e. Microsoft Excel®) are not recognized as TERPS automation and may not be used as such. They may however be used to perform routine/repetitive mathematical calculations associated with manual evaluations with the following restrictions:

11.1.2.1. Manual evaluation augmented by self-calculating spreadsheets shall not be used as an alternative to a full, automated evaluation when USAF GPD supports the procedure/chart type.

11.1.2.2. Self-calculating spreadsheet results may not be used as the sole source of TERPS analysis (determination of minimum segment altitudes, landing minimums, climb gradients, etc.). When used to augment manual evaluations, include in package documentation enough supporting data, charts, and drawings so that any reviewer can easily determine how the input values were derived (i.e. distance measurements to obstacle, OCS origin elevations, etc.). MAJCOMs must validate and document the mathematical formulas embedded in self-calculating spreadsheets and establish a process to control version currency prior to releasing for MAJCOM-wide use.

11.1.3. Mission/flight planning software (i.e. FalconView™) is not recognized as TERPS automation may not be used as such. It may however be used with the following restriction. Mission/flight planning software may be used to view NGA raster products (CIB/CADRG) in order to visualize the obstacle/terrain environment whenever deemed necessary. This includes downloading and display NGA Electronic Chart Updating Manual (ECHUM) data. However, it may not be used in any capacity for tasks that involve the evaluation of terrain or man-made obstructions against TERPS obstacle clearance surfaces. This includes the use of printed or plotted maps/charts in lieu of appropriate paper products for manual drawings and evaluation.

NOTE: The resolution of CADRG map products is a limiting factor for unrestricted TERPS use. Some maps contain areas where small or fine details are unreadable. This is especially true of (but not limited

to) large-scale maps with close contour lines and congested features. Some obscuration is the result of printer/plotter or paper quality, however resolution issues are not resolved by using photo quality paper and high-resolution printers. This is a result of the compression process used to reduce the size of the scanned map files; therefore even on-screen images are not the same quality as a paper product map/chart.

11.2. USAF GPD Hardware Requirements. See **Table 11.1.**, **Table 11.2.**, and **Table 11.3.**.

11.2.1. Evaluate the adequacy of USAF GPD workstations as a minimum every two years and update as necessary based on the most current hardware requirements.

NOTE: While the system will function on the minimum required workstation, every effort should be made to acquire workstations meeting or exceeding recommended performance to achieve maximum efficiency.

11.2.2. In addition to the hardware requirements, USAF GPD workstations shall have access to the internet via Local Area Network (LAN), an established AFFSA FTP account with the supporting software, and an e-mail account in order to facilitate the transfer of electronic files.

Table 11.1. Recommended USAF GPD Hardware

RECOMMENDED DESKTOP WORKSTATION:	
OPERATING SYSTEM:	MICROSOFT WINDOWS 2000 PROFESSIONAL, SP 4
CPU	INTEL P4 3+ GHZ, 800 MHZ FSB, 2MB L3 CACHE
RAM	4 GB, DDR400 SDRAM MEMORY, ECC (4 DIMMS)
GRAPHICS CARD	128MB SDRAM, SUPPORT DUAL MONITOR VGA OR DVI/ VGA CAPABLE (ENSURE HARDWARE CAPABILITY)
MONITOR	21", MINIMUM 3600 BY 1441 PIXELS CAPABLE
2ND MONITOR	21", MINIMUM 3600 BY 1441 PIXELS CAPABLE
HARD DRIVE	120GB SATA, 7200 RPM HARD DRIVE WITH DATABURST CACHE‰ SARC RAID
2ND HARD DRIVE	OPTIONAL
DVD	REQUIRED, DVD+RW/+R
CD-R/W	REQUIRED
FLOPPY DRIVE	REQUIRED
NETWORK CARD	ETHERNET PCMCIA 10/100 BASE T (OR APPROPRIATE LAN INTERFACE CARD)
SOUND	REQUIRED, SOUND CARD AND SPEAKERS
ADDITIONAL SOFTWARE	MICROSOFT OFFICE PRO SUITE, FILE TRANSFER PROTOCOL (FTP)
COLOR PRINTER	REQUIRED, LASER OR INK JET TECHNOLOGY, WITH MINIMUM 600 DPI RESOLUTION. CONFIGURED WITH MAXIMUM RAM, MINIMUM 32MB RAM
COLOR PLOTTER	REQUIRED, INK JET TECHNOLOGY, WITH MINIMUM 600 DPI RESOLUTION. MINIMUM 36X48 (E SIZE) PAPER SIZE. WITH MINIMUM 600 DPI RESOLUTION. CONFIGURED WITH MAXIMUM RAM, MINIMUM 32MB RAM

11.3. Initial USAF GPD adaptation/conversion. Establish initial USAF GPD capability as directed by the MAJCOM-established training/fielding plan. Take the following actions:

11.3.1. Prior to USAF GPD installation;

11.3.1.1. Acquire a computer workstation that meets hardware requirements, and have it configured by local work group managers for use, paying particular attention to the operating system requirements (see paragraph **11.2.**). No Oracle®,-based applications can be installed on the workstation at the time of USAF GPD installation.

NOTE: Installation and use of USAF GPD on a system utilizing Windows® XP is not authorized since deviation from OS requirements may have unknown affects. The results of TERPS evaluations developed on a workstation with a non-standard OS are not endorsed or authorized for publication.

11.3.1.2. Establish a recurring requirement (automatic distribution) for those digital aeronautical products required for use (see paragraph **1.3.9.3.** and paragraph **1.5.2.**). Establish and maintain a digital source library for your area of responsibility with best available data (in the following order of precedence):

11.3.1.2.1. DAFIF (mandatory for full automated evaluation)

11.3.1.2.2. DVOF (mandatory for full automated evaluation)

Table 11.2. Minimum USAF GPD Hardware

MINIMUM DESKTOP WORKSTATION:	
OPERATING SYSTEM	**MICROSOFT WINDOWS 2000 PROFESSIONAL, SP 4**
CPU	**INTEL P-IV 2+ GHZ, 512 K CACHE**
RAM	**1-GB (SDRAM), EXPANDABLE TOTAL 4-GB**
GRAPHICS CARD	**32MB SDRAM**
MONITOR	**19", 3600 BY 1441 PIXELS CAPABLE**
2ND MONITOR	**OPTIONAL**
HARD DRIVE	**80-GB**
2ND HARD DRIVE	**OPTIONAL, 40+ GB**
DVD	**DVD-ROM, REQUIRED. DVD-R/W, OPTIONAL**
CD-R/W	**REQUIRED**
FLOPPY DRIVE	**REQUIRED**
NETWORK CARD	**ETHERNET PCMCIA 10/100 BASE T (OR APPROPRIATE LAN INTERFACE CARD)**
SOUND	**REQUIRED, SOUND CARD AND SPEAKERS**
ADDITIONAL SOFTWARE	**MICROSOFT OFFICE PRO SUITE, FILE TRANSFER PROTOCOL (FTP)**
COLOR PRINTER	**REQUIRED, LASER OR INK JET TECHNOLOGY, WITH MINIMUM 600 DPI RESOLUTION. CONFIGURED WITH MAXIMUM RAM, MINIMUM 32MB RAM**
COLOR PLOTTER	**REQUIRED, INK JET TECHNOLOGY, WITH MINIMUM 600 DPI RESOLUTION. MINIMUM 36X48 (E SIZE) PAPER SIZE. WITH MINIMUM 600 DPI RESOLUTION. CONFIGURED WITH MAXIMUM RAM, MINIMUM 32MB RAM**

11.3.1.2.3. DTED in this order (mandatory for full automated evaluation)

11.3.1.2.3.1. SRTM

11.3.1.2.3.2. DTED LEVEL 2

11.3.1.2.3.3. DTED LEVEL 1

11.3.1.2.4. Vector MAP in this order (required for partial automated evaluation. If none available paper maps are required)

11.3.1.2.4.1. UVMAP

11.3.1.2.4.2. VMAP2

11.3.1.2.4.3. VMAP1

11.3.1.2.4.4. VMAP0

11.3.1.2.5. NACO digital VFR sectionals (required for automated evaluation of charts in CONUS and recommended for automated evaluation of procedures)

Table 11.3. USAF GPD Hardware (Laptop)

LAPTOP:	
OPERATING SYSTEM	**MICROSOFT WINDOWS 2000 PROFESSIONAL, SP 4**
CPU	**INTEL P4 3+ GHZ, INTEL P-IV 1.8 GHZ, 15" ULTRASHARP UXGA DISPLAY**
RAM	**1-GB**
GRAPHICS CARD	**64MB**
HARD DRIVE	**60+ GB 80-GB**
2ND HARD DRIVE	**OPTIONAL, 20 GB**
DVD/CD-R/W	**INTERNAL 8-8-8-24X SWDVD/CDRW COMBO DRIVE**
FLOPPY DRIVE	**REQUIRED**
NETWORK CARD	**ETHERNET PCMCIA 10/100 BASE T (OR APPROPRIATE LAN INTERFACE CARD)**
ADDITIONAL SOFTWARE	**MICROSOFT OFFICE PRO SUITE, FILE TRANSFER PROTOCOL (FTP)**

11.3.1.2.6. Raster Maps to include CADRGs (ONC/TPC, JOG, 100K, 50K or MIM) and CIBs (see paragraph **11.1.3.** Note).

11.3.1.3. Prepare AFTERPS legacy automation databases (.LOC files) for import into USAF GPD.

11.3.1.3.1. Ensure that there are no ‘non-typical’ obstacle entries (i.e. false obstacles marking DVOF ingest date, recording DTED version etc.) or the process will fail.

11.3.1.3.2. Review the accuracy and completeness of obstacle data, with primary emphasis on those man-made structures and/or terrain + vegetation entries on or in close proximity to the

aerodrome (from the CE Map Master Obstacle Chart). Eliminate duplicate obstacles if possible.

NOTE 1: DTED/DVOF obstacles will not be imported from the legacy location file with one exception. Only DTED obstacles that have been edited by the legacy AFTERPS automation (identified in the location file as "DTED ELE MV") ***will*** be imported into USAF GPD. DTED elevations with adjustments for trees (DTED MA) will not be imported. DTED obstacles edited using a text editor or identified in any other way than "manually verified" will NOT be imported.

NOTE 2: USAF GPD will not import any aeronautical data relating to NAVAIDs, aerodrome (ARP), or runway (to include lighting) from the AFTERPS legacy .LOC file. These are imported into GPD directly from digital source.

11.3.1.4. Review/compare aeronautical source data, (surveys, facility/ASIS data sheets, legacy AF Form 3628, Host Nation AIP) and resolve any data disparities.

11.3.2. Install USAF GPD in accordance with the Operations Manual Volume1, Chapter 3. Contact AFFSA USAF GPD Help Desk to obtain a license key. After installation create user accounts IAW Operations Manual Volume 1, Chapter 4 for each individual authorized to use USAF GPD on the workstation, consisting of the users first and last name. Each individual user must log in separately each time USAF GPD is used. Common accounts/shared passwords are not authorized.

11.3.3. Prepare USAF GPD for use. Establish the globalspace and required workspaces. Follow the expected workflow outlined in **Table 11.4.** (also see Operations Manual Volume 1, Table 2-1). The steps outlined are for the most part self explanatory, however certain critical steps are explained as follows;

CAUTION: Failure to follow the workflow sequence described in **Table 11.4.** may result in loss of data.

Table 11.4. USAF GPD Initial Adaptation Workflow

Workflow	Action
1. Import current DAFIF data	Add to USAF GPD with the USAF Geospatial Data Manager Reference OM Volume I – *Import DAFIF*
2. Import current DVOF data	Add to USAF GPD with the USAF Geospatial Data Manager Reference OM Volume I – *Import DVOF*
3. Identify the Airport/Aerodrome of Interest	For the Airport/Aerodrome of interest identify available products: - Legacy Location files - Terrain products, DTED or DEM - Additional raster and vector products for geographic context during the procedure or chart design
4. Import AFTERPS legacy location files	Add to USAF GPD with the USAF Geospatial Data Manager. This only needs to be done once per workspace. Reference OM Volume I – *Import DVOF* ??*The Manual Obstacle Import Process*
5. Import terrain data	Add to USAF GPD with the USAF Geospatial Data Manager Reference OM Volume I – *Import Terrain D*ata
6. Import raster and vector products for geographic context	Add to USAF GPD with the USAF Geospatial Data Manager Reference OM Volume I – Import Vector Data and Import *Raster Data*
7. For the Airport/Aerodrome of Interest, create a workspace.	Create with the USAF Geospatial Data Manager Reference OM Volume I – *Create a Workspace*
8. Obtain accurate information about the aeronautical assets in the environment	Obtain Legacy AF Form 3628 Data Verification for the Airport/Aerodrome of Interest Or Use other accepted data source, for example, survey , FAA ASIS data sheet
9. Evaluate completeness and accuracy of aeronautical data	Determine the quality of the aeronautical data in the workspace using the USAF Geospatial Data Manager Reference OM Volume I – *Aerodrome and Runway Quality Report* and *NAVAID Quality Report*
10. Reconcile the information in hand with the information in DAFIF. Enter corrections.	Correct and supplement aeronautical data in USAF GPD using the USAF Geospatial Data Manager Reference OM Volume I – *Manual Changes to Aeronautical and Obstacle Data* and *Database Forms*

Workflow	Action
11. Supplement the aeronautical data with information necessary for instrument procedure or chart design.	Supplement aeronautical data in USAF GPD using the USAF Geospatial Data Manager Reference OM Volume I – *Supplementing Published Data* and *Database Forms*
12. Evaluate completeness and accuracy of obstacle data and correct with the information in hand	Correct obstacle data in USAF GPD using the USAF Geospatial Data Manager, the USAF Instrument Procedure Designer or the USAF ATC Chart Designer Reference OM Volume I – *Obstacle Quality Report* and *Database Forms – Obstacle Form* *This activity may be done in conjunction with Instrument Procedure or Chart Design to limit corrections to obstacles that affect minimum altitudes.

11.3.3.1. Step 4 - Import AFTERPS legacy location files. Ensure the location file contains the most current obstacle edits/updates prior to initiating the import process. During initial GPD adaptation, there will normally be no duplicate or updated obstacles. Review the new obstacles list and uncheck any that you do not wish to import (i.e duplicated or deleted obstacles). Spot elevations/contour lines without additional allowance for trees may be equal to the terrain model when high quality DTED (Level 2/SRTM) is imported. Unless the point has significant impact on the procedure and there is high confidence in the accuracy of the data, do not import obstacles from AFTERPs legacy that are terrain-based.

CAUTION: When you accept to import new obstacles (leaving box checked and selecting OK), the entire group of obstacles will be entered into the globalspace and cannot be removed except by creating a workspace and deleting them individually.

11.3.3.2. Step 10 and 11 – Evaluate accuracy and reconcile aeronautical data discrepancies/add supplementary data as required. All data imported from DAFIF shall be verified against source to confirm accuracy. DAFIF data includes aerodrome location/magnetic variation, NAVAID, runway (to include lighting), airspace (controlled and SUA), and airways (ATS Routes). If doubt exists to the accuracy of the source data, request a survey to validate the data. MAJCOM TERPS is the OPR for initiating survey requests (see AFI 14-205, ***Identifying Requirements for Obtaining and Using Cartographic and Geodetic Products and Services***). Additionally, some values required for TERPS analysis are not contained in DAFIF and must be added as supplementary data. Report coordinates in WGS-84. The following data must be resolved in Data Manager prior to procedure development.

11.3.3.2.1. Aerodrome Assigned [magnetic] Variation.

11.3.3.2.2. Runway Physical/Landing/Takeoff/Displacement lengths. Ensure the data accurately reflects the actual runway configuration, especially when there are threshold displacements. Pay particular attention to takeoff lengths and DER location, since the DAFIF value may include non-load bearing overruns. Also make sure that the displaced threshold elevations are entered. ***Failure to correct these values may result in incorrect evaluation of procedures.***

Figure 11.1. Runway Physical/Landing/Takeoff /Displacement Lengths.

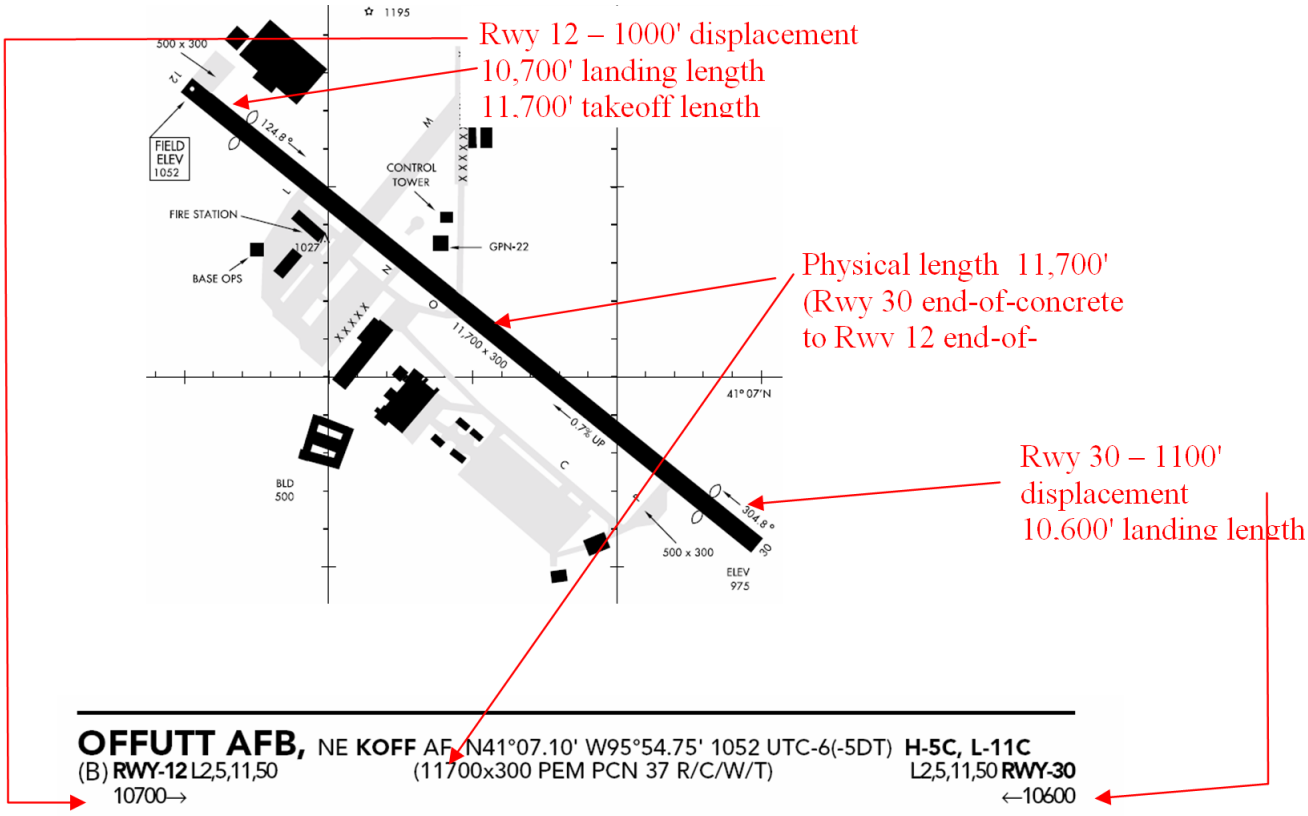
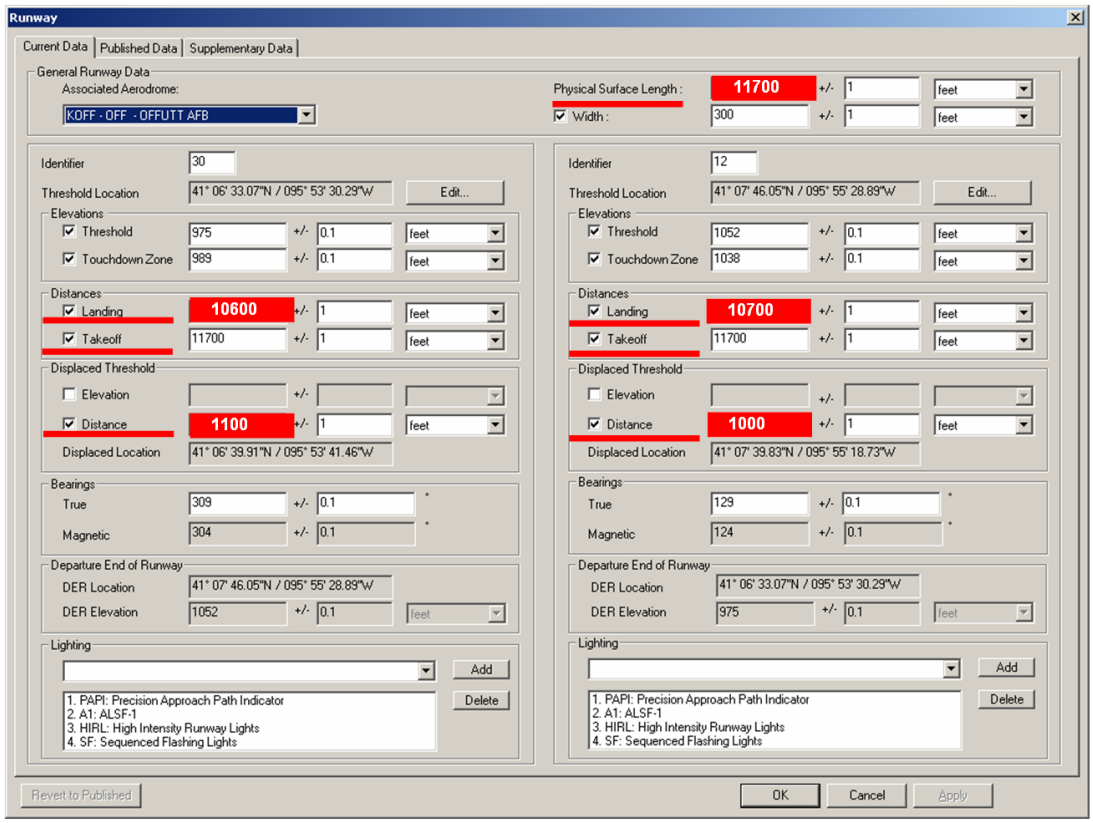


Figure 11.2. Runway Physical/Landing/Takeoff /Displacement Lengths in GPD.



11.3.3.2.3. Runway/lights supplementary data. Enable supplementary data **<u>for each runway</u>** and add RVR availability if appropriate. Coordinate with local Airfield Manager and/or CE to determine the runway capability based on runway markings, etc. (i.e suitable for circling only/ non-precision/CATI/CATII/CATIII precision). Also enable the supplementary data for each visual glidepath system, adding TCH, VGSI angle and the light bar(s)distance from threshold (as appropriate). Add supplementary approach light length if the system is non-standard.

11.3.3.2.4. Omni-directional NAVAIDs. Ensure that the antenna elevation is entered and correct. Check the Radio Class (see FAA Order 8260.19, Chapter 2) to ensure the standard service volume is correctly evaluated. Do not edit the frequency protected service volume unless valid source data indicates that it is less than standard. Ensure the assigned NAVAID variation is correct.

Figure 11.3. Omni-directional NAVAID Radio Class.

Date:07/06/04 13:24pm

* * * TACAN INQUIRY - ACTIVE * * *

DATUMS Horz: NAD83 Vert: NAVD88 CTRY: US

LCTN: OMAHA ST: NE REG: CE FIFO: BTL OWN: A

LCTN	OMAHA	ST	NE	REG	CE	FIFO	BTL	OWN	A	ICAO	K	CLASS	L	VOICE			NONE
NAME	OFFUTT	MONITOR-CAT			1		MONITOR-LCTN			OFF ATCT					NFPO-PROCEDURES		120
YR/MVAR	1995/E05									ARTCC	ZMP						

11.3.3.2.5. Airport NAVAIDS. Check all ILS glideslope and localizer data for accuracy (see Figure 11.3.). Pay particular attention to the localizer coordinates, which determine its actual position (distance and "relative to" point provided for reference/documentation only). Ensure the localizer course is entered as a true value (vice magnetic). Normally this value is the same as the runway true azimuth but may be different, especially if the localizer is offset. Ensure that the assigned variation of the localizer is the same as the aerodrome assigned variation. For glideslope, pay particular attention to the distance and "relative to" point (should normally be after threshold).

Figure 11.4. Airport NAVAIDs (example ILS).

Date:07/06/04 13:36pm

* * * ILS INQUIRY - PENDING * * *

DATUMS Horz: NAD83 Vert: NAVD88 CTRY: US

AIRPORT: OFFUTT AFB ARPT-ID: KOFF RWY: 30 LCTN: OMAHA ST: NE REG: CE FIFO: BTL OWN: A

* * * AFIS DATA * * *

IDENT	OFF	GLA	N41-06-52.44	GS-OFF	R499	GS-LC-DIS	9411	
RW-BRG	309.13	GLO	W095-53-52.45	GS-OM-DIS	26932	LC-OFF		
FREQ	109.500	GS-ANG	2.80	GS-TH-DIS	1412	LC-FCB	309.13	2
MVAR	1995/E05	3 GS-WID	0.70	TH-HGT	975	LC-BCB	129.11	
CAT	I	GS-HGT	964.4	RE-HGT	1052	LC-WID	3.71	
		R-LDG-LGTH	10624					

* * * LOCALIZER * * * (DFL CODE - ILS/L)

ANT LAT	N41-07-47.27	XMTR	DUAL	LOC-RE	199/ 0.033	LCW-TAIL	YES
ANT LON	W095-55-31.95 1	EQUIP-TYPE	WILCOX	LOC-TH	10823/ 1.781	LCW-FT-TH	701
ELEV	1050.5	STBY-POWER	G	LOC-IM		DATE-COMM	06/28/90
ANT-TYPE	LOG-PER	ESV	N	LOC-MM		DATE-RECON	
DUAL-FREQ	NO	RESTRICTED	N	LOC-OM		SURVEY-ACCY	6
US-DIST: FC	5547/ 18.0	BC		LOC-FAF	36343/ 5.981	VOICE	NONE
CLRNC-CVG:FC	90/35 150/35	BC		MON-AL-WID	W 4.34 N 3.08	REC TYPE	
CKPT-DESC: FC	OFF TAC 4.6 DME/RADAR			BC			
LOC-WIDTH-MX-ALERT:	4.09/ 3.33			LOC-AL-MX-ALERT:	9uA	ROLLOUT:	N
LOC-WIDTH-INITIAL:	4.23/ 3.19						

* * * GLIDE SLOPE * * * (DFL CODE - ILS/G)

ELEV	964.4	XMTR	DUAL	DIST-TH-PT-C	857.6/ 0.141	GS-ANT-OFF	R499
ANT-TYPE	NULL-REF	EQUIP-TYPE	WILCOX	GS-TH	1412 / 0.232 4	MON-AL-ANG	H 3.08/L 2.59
CL-ELEV-ABM	975.3	FREQ	332.600	GS-IM		DATE-COMM	06/29/90
TCH	58.1	ESV	N	GS-MM		DATE-RECON	
ELEV-FOR-CALC	SITE	RESTRICTED	N	GS-OM		SURVEY-ACCY	6
AFIS-CORDS	ANTENNA	GPI-TH	1187.1	GS-FAF	26932/ 4.432	STBY-POWER	G
ANT: LAT	N41-06-52.44	RPI-TH	1188.8	AIM-PT-LAT	N41-06-48.61	CBP-TH	N
LON	W095-53-52.45			LON	W095-53-56.57		

* * * AIRPORT DATA * * *

ARP-LAT	N41-07-09.57
ARP-LON	W095-54-30.62
FIELD-ELEV	1052.1
TH-LAT	N41-06-33.08
TH-LON	W095-53-31.33
TH-ELEV	975.4
RE-LAT	N41-07-46.03
RE-LON	W095-55-29.94
RE-ELEV	1052.1
RWY-LGTH/WIDT	11701/300
DSPLCD-TH-DIST	1077
DSPLCD-TH-LAT	N41-06-39.80
DSPLCD-TH-LON	W095-53-42.24
DSPLCD-TH-ELEV	975.4
RWY-LDG-LGTH	10624
TDZ-ELEV	989.0
FAR PART 139	No

DECISION-HEIGHTS:

DH	DIST/RALT	
(100)	0	0
(150)	0	0
(200)	0	0

PERFORMANCE-CLASS I / C /

FPC PUBLISHED

GENERAL DATA:

YR/MVAR 1995/E05 3

ICAO K

BC-STATUS

1. Localizer location (geodetic coordinates). 2. Localizer front course bearing. 3. Airport/localizer assigned magnetic variation. 4. Glideslope location (distance after threshold).

11.3.3.2.6. Add all ASR/PAR Radar data as needed to support required procedures/charts (DAFIF does not include any Radar data).

11.3.3.2.7. Verify aeronautical data used meets Radio Technical Commission for Aeronautics (RTCA) standards for aeronautical integrity. When available source data does not meet these

standards or it is unclear whether these standards have been met, attempt to obtain compliant source data. If this is not possible, use the best available data, and annotate in the procedure the efforts taken to resolve the discrepancy. GPD will provide a operational warning when RTCA standards have not been met, (waiver/justification not required). Ensure the following critical elements are reported to the specified accuracy:

NOTE: This list is not all inclusive, however it contains those data elements that most often will affect procedure development.

11.3.3.2.7.1. Terminal VHF/UHF NAVAIDs location – report location to 1/100th of a second (geodetic coordinates +/- 0.01). Elevation – not to exceed 100' vertical.

11.3.3.2.7.2. Precision NAVAID (ILS/MLS) components - report location to 1/100th of a second (geodetic coordinates +/- 0.01). Elevation –not to exceed 1' vertical.

11.3.3.2.7.3. Aerodrome Reference Point - report location to 1/10th of a second (geodetic coordinates +/- 0.10). Elevation - not to exceed 1' vertical.

11.3.3.2.7.4. Rwy thresholds - report location to 1/100th of a second (geodetic coordinates +/- 0.01). Elevation - not to exceed 1' vertical.

11.3.3.2.7.5. Threshold crossing height – Elevation – not to exceed 1' vertical.

11.3.3.2.7.6. Fixes/waypoints – report location to 1/100th of a second (geodetic coordinates +/- 0.01).

11.3.3.2.7.7. Declination and magnetic variation (to include aerodrome and NAVAID assigned variation) – report to 1/10th degree (+/-0.10 degrees).

11.3.3.2.7.8. Course/bearing (to include runway bearing, localizer alignment) – report courses to 1/100th degree (+/- 0.01 degrees).

11.3.3.2.7.9. Length/distance (to include runway lengths/widths, distances related to ILS/MLS component – report to distances to 1' (+/- 1').

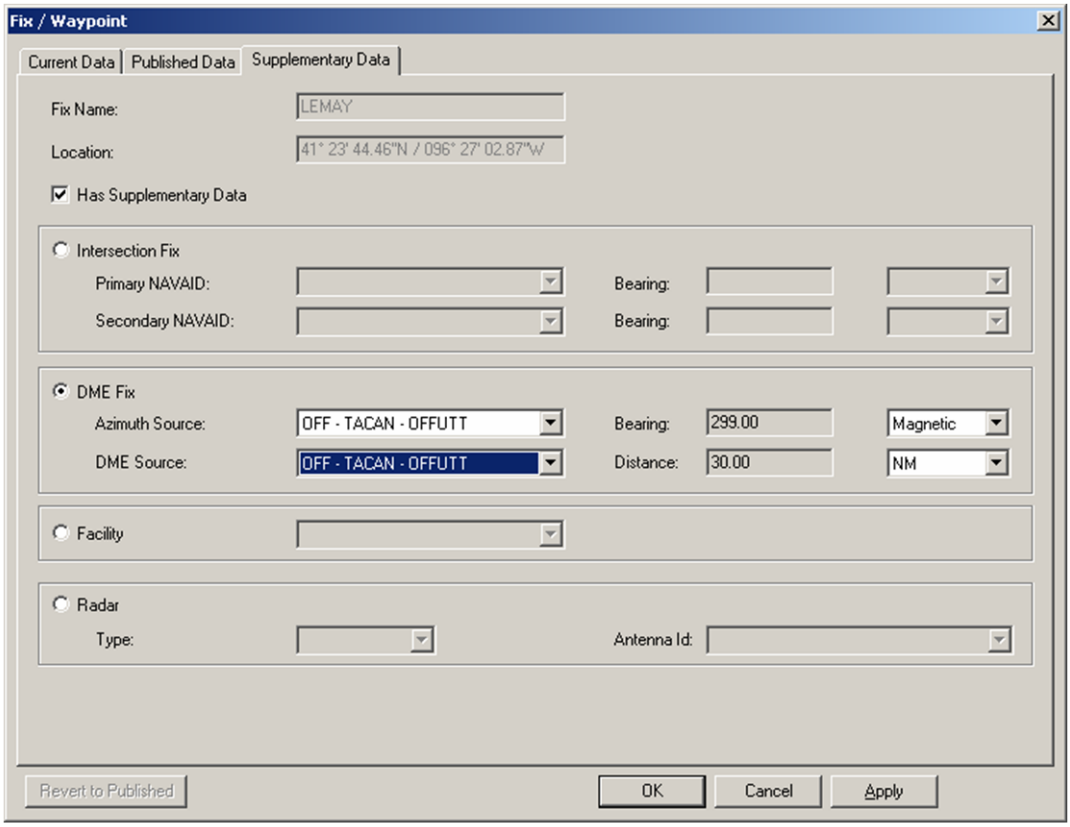
11.3.3.2.7.10. Angular data (to include ILS /MLS Precision RNAV Glidepath Angle, visual descent angle) – report to 1/100th degree (+/- 0.01 degrees).

11.3.3.2.8. Add supplementary Named Fix/Waypoint data. Fix data imported from DAFIF does not include any data other than it's geodetic location. TERPS evaluation requires additional data to correctly determine fix error. Unless a named fix is intended solely for 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 7350.7, *Location Identifiers,* or from source copy FAA Form 8260-2, *Radio Fix and Holding Data*. Named fixes without supplementary data added will be marked "RNAV only" and will only be displayed when building RNAV procedures.

Figure 11.5. Fix Data for 'LEMAY' from FAA Order 7350.7, Location Identifiers.

LEMAY NE	OFF*T*299.ØØ/3Ø.ØØ 41-23-44.46N Ø96-27-Ø2.87W

Figure 11.6. Fix/Waypoint Supplemental Data for 'LEMAY' in Data Manager.



11.3.3.3. Step 12 - Evaluate the accuracy and completeness of obstacle data. To facilitate this process GPD will produce an obstacle quality report at both the workspace level in Data Manager and at the procedure level in Procedure Designer. Resolving obstacle quality at the procedure level is authorized. These reports detail obstacles with quality issues (for example those with unknown height above MSL; height above MSL is 0.0; unknown vertical accuracy; vertical accuracy of 0.0; unknown horizontal accuracy; horizontal accuracy less than 1m; accuracy of height above MSL is greater than 25% of obstacle AGL height; obstacles that are defined as underground when reconciled with the terrain, and/or those with horizontal accuracy based on latitude/longitude.

11.3.3.3.1. For those obstacles located in the procedure obstacle search areas (evaluated obstacles) with an unknown MSL height, an MSL height of zero, or an height defined as underground when compared with the terrain model, contact the data source to determine the actual MSL height of the obstacle. If the obstacle height cannot be determined from the data source, attempt to identify the obstacle by map search or by contacting NGA for imagery anal-

ysis. Annotate in the user entered notes the remark "CONTROLLING OBSTACLES CANNOT BE VERIFIED IN [APPLICABLE SEGMENT(S)]". Document actions attempted to resolve the discrepancy and process the procedure as non-standard, special use. If developed to support an FTIP review, include the remark in the review letter.

11.3.3.3.2. For those obstacles that fall in the procedure obstacle search areas (evaluated obstacles) derived from a digital source that does include accuracies, but the accuracies are unknown, missing or zero, contact the data source to determine the actual vertical and horizontal accuracy of the obstacle (see **Figure 11.7.** and **Figure 11.8.**). If the accuracies cannot be determined from the data source, attempt to identify the obstacle by map search and apply the values from **Table 11.5.**. If all possibilities have been exhausted, apply the worst-case horizontal/vertical accuracy from **Table 11.5.**, and annotate actions taken in the user entered notes. The procedure may be published and processed as standard.

11.3.3.3.3. For those obstacles located in the procedure obstacle search areas (evaluated obstacles) derived from legacy AFTERPS location files, the source data does not include accuracies therefore the horizontal and/or vertical accuracies must be declared. At the procedure level, when AFTERPS-legacy database obstacles are identified in the evaluated obstacles, determine how the obstacles were originally determined. Those obstacles that were determined from the CE map MOC search shall be assigned accuracies based on CE maps (see **Table 11.5.**). Likewise, assign accuracies consistent with the map used for those obstacles derived from the 0 - 10 NM, 10 - 30NM, and 30 - 60 NM etc. MOC searches.

NOTE: Accuracies derived from any source may be reduced to 250’ (75m) horizontal and 50’ (15m) vertical when confirmed by flight inspection flyby.

Figure 11.7. Adjustment of Obstacle Height Based on Vertical Accuracy.

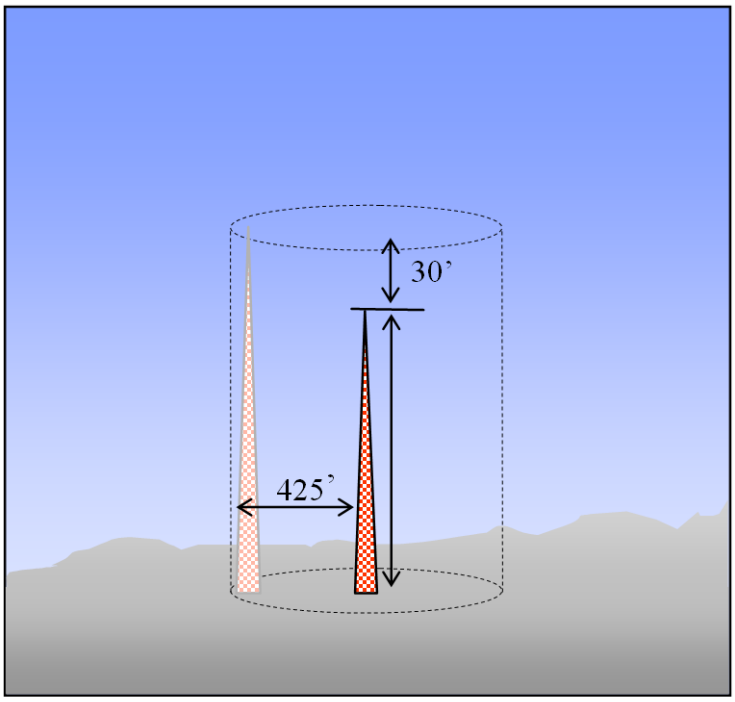


Table 11.5. Horizontal and Vertical Accuracies as Determined by Map Source.

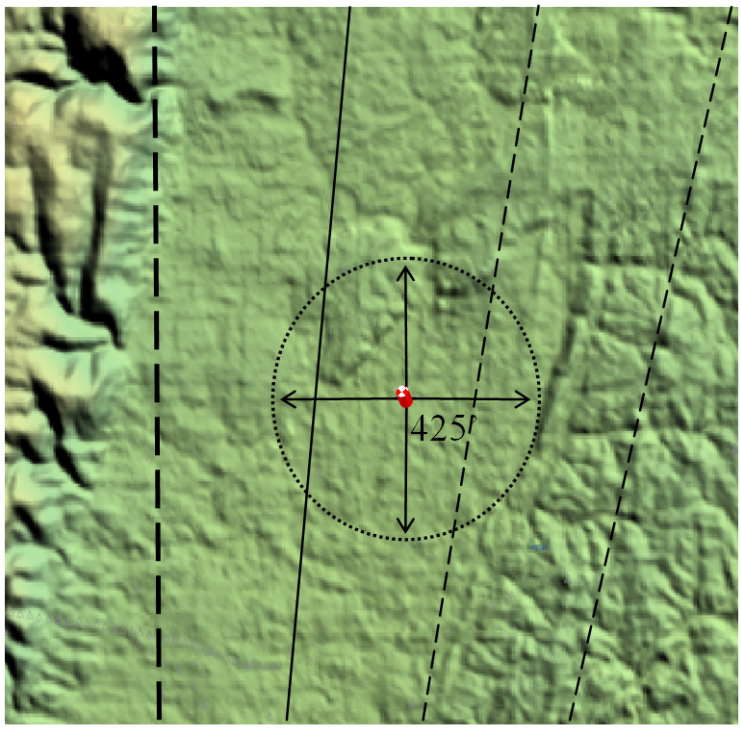
MAP TYPE	HORIZONTAL ACCURACY	VERTICAL ACCURACY
USAF Civil Engineering Map [1] or Geobase CIP foundation / digital equivalent	40’ (12m)	20’ (6m)
USGS Topographical 1:20,000/ 1:24,000/1:25,000/ 1:100,000	40’ (12m)	20’ (6m) [3]
USGS Topographical 1:62,500/1:63,360	150’ (75m)	50’ (15m) [3]
USGS Topographical 1:250,000	1000’ (300m)	100’ (30m) [3]
World Aeronautical Chart/NGA Operational Navigation Charts (1:1,000,000)	3400’ (1000m)[2]	500’ (150m)
VFR Sectional/ NGA Tactical Pilotage Chart (1:500,000)	1800’ (550m) [2]	250’ (75m)
VFR Terminal Area chart/ NGA Joint Operations Graphic (1:250,000)	1000’ (300m) [2]	250’ (75m)

[1] See FAA ORDER 8260.19 Appendix 2 for FAA Airport Obstruction Chart (OC) accuracies.

[2] Horizontal accuracy may be reduced by ¾ for terrain features. The larger accuracy applied to manmade obstacles is to account for displacement from application of "cartographic license" allowed by IACC specifications.

[3] When obstacles or mountain peaks are specifically marked by a spot elevation, the vertical accuracy changes to 3’ (1m).

Figure 11.8. Adjustment of Obstacle Location based on Horizontal Accuracy



11.4. Additional GPD Considerations/Miscellaneous.

11.4.1. For manual additions/revisions to aeronautical and/or obstacle data in GPD, geodetic coordinates must be entered in WGS-84. If source data is in another datum, coordinates MUST be converted prior to use.

NOTE: Differences between WGS-84 and NAD-83 are so slight that there is no reason to convert NAD-83 coordinates for most locations in the contiguous United States. There are locations, however (i.e. extreme South or Southwestern states), where the difference is significant enough to warrant conversion.

11.4.1.1. When entering manual obstacles after initial GPD adaptation, apply horizontal and vertical accuracies based on the data source as described in paragraph **11.3.3.3.**. If the accuracies come from an OE/AAA case study or from an airfield survey, apply the declared accuracies. If the accuracies cannot be determined from the data source, attempt to identify the obstacle by map search and apply the values from **Table 11.5.** If all possibilities have been exhausted, apply the worst-case horizontal/vertical accuracy from **Table 11.5.**, and annotate actions taken in the user entered notes. The procedure may be published and processed as standard.

11.4.2. Touchdown zone elevation may be surveyed and reported to the nearest 1/10th or 1/100th foot, however this value must be rounded to the nearest whole foot for use by GPD (for example 989.42 surveyed must be entered as 989.0). Changing the accuracy (i.e. +/ 1 ft instead of +/- 0.01 ft) does not produce the required outcome. Failure to comply with this guidance will have an undesired affect on approach minimums.

11.4.3. When using GPD to develop procedures to support FTIP review and the host nation only publishes the Reference Datum Height (RDH) in the AIP, take the following actions;

11.4.3.1. ICAO/NATO criteria. Enter the host-specified RDH in the ILS supplementary data. The runway crown elevation abeam GS antenna is not required, however, the GS Antenna elevation and distance GS antenna to threshold must be entered even when an RDH is specified. Neither value has any impact on the design of the procedure; therefore the values entered are not important. Annotate in the procedure remarks actions taken when 'false' values are entered with rationale for this action.

11.4.3.2. USAF criteria. RDH may be entered, but the TCH/GPI/RPI is still calculated based on the values entered. Crown elevation is not a required value; if it's not entered, GPD uses the GS antenna elevation for GPI/RPI calculations. To calculate other values, first use the following formula to calculate GPI:

GPI = TCH/(tan)GS

11.4.3.2.1. Using the host nation threshold elevation, TCH and GS angle, and the calculated GPI, enter the following data into the ILS data in Data Manager:

11.4.3.2.1.1. Enter threshold elevation for GS antenna site elevation.

11.4.3.2.1.2. Enter the calculated GPI Distance as the GS antenna to threshold distance.

11.4.4. GPD by default applies rapidly dropping terrain calculations when determining TCH/RPI/GPI. When source data indicates that relatively smooth calculations were used, edit the ILS glideslope data in Data Manager by changing the glideslope antenna ground elevation to equal the surveyed runway crown elevation. Annotate steps taken in the user defined notes and provide rationale for this action.

11.4.5. GPD utilizes terrain data from DTED/SRTM/DEM and obstacle data from NGA DVOF and legacy AFTERPS location files. The location file is usually the only source of data relating to on- or near-aerodrome obstructions at USAF locations. In order to continue to consider these "close-in" obstructions, or when establishing an entirely new TERPS program (for example at a contingency location), develop and/or maintain a master obstacle chart centered on the aerodrome reference point and extended to at least the base perimeter or to the extent of the CE maps/airport obstruction charts (OCs) or topographical map equivalents. Digital GIS or Geobase Common Installation Picture (CIP) equivalents to E- and C- series CE maps may also be used for obstacle searches/master obstacle charts. Enter identified obstacles in Data Manager, and apply horizontal/vertical accuracies in accordance with **Table 11.5.**. The search area shall be constructed and evaluated as follows;

11.4.5.1. Construct a line originating at the ARP extending out to the map edge. Repeat the line in 5-degree intervals for 360 degrees.

11.4.5.2. Construct concentric circles, each centered on the ARP, in intervals of 0.25 NM (.25, .50, .75, 1.0, etc.) outward to the map edge.

11.4.5.3. Each 5-degree by 0.25 NM splay area represents an area for obstacle search/identification. Identify the object with the highest MSL elevation within each splay area and record as a new obstacle. *Obstacle shadowing is not authorized.* For example, if in the first splay area from ARP the highest object is 150' MSL, you may not disregard a 140' MSL object in the following splay along the same 5 degree interval. Exception: Objects with an MSL elevation below the lowest

threshold elevation may be excluded. If there are no above ground objects in the splay higher than the lowest threshold elevation, continue out the 5-degree splay until finding an object that is higher.

***NOTE 1*:** GPD differs from the legacy software in that the terrain model is considered separately from man-made obstacles. DO NOT enter bald terrain spot elevations or elevation contours as a manual obstacle unless significantly higher than the digital terrain data.

***NOTE 2*:** GPD has the capability to include a vegetation allowance to the terrain model, however the increased MSL elevation for trees is not applied within 1.5 NM around each runway threshold. Any vegetated (tree covered) area in an obstacle identification splay with an AGL tree height + MSL contour elevation higher than the lowest threshold elevation shall be added as a manual obstacle. In order to account for vegetation and growth, determine the maximum growth of the tallest tree species indigenous to the area (contact State Forestry Division or Host Nation equivalent). If desired/necessary, procedure specialists may elect to reduce the maximum tree height if a lower height can be verified by a qualified source (i.e. Forestry Dept. confirms vegetated area does not include largest indigenous tree species, or qualified survey source determines actual tree height). When the latter option is chosen, consider annual rate of growth and update the obstacles height on a recurring (annual) basis.

***NOTE 3*:** The intent of this criteria is not to construct new MOCs during GPD adaptation if there is an existing MOC supporting the legacy AFTERPs location file. Those DTED postings that were correctly verified and edited using the legacy software will be added to the globalspace when GPD imports the location file. Continue to maintain the existing MOC based on this criteria and consider all new construction/vegetation growth.

11.4.5.4. Adverse assumption shall be used to consider the most critical height of un-measurable obstacles (trees, power poles/lines, etc.). When assumptions are made, document source(s) used to apply assumed values and retain in TERPS records. When evaluating contour lines to determine the MSL elevation of an above ground object where only the AGL height is known, use the following technique to take care of the hilltops and draws: Use one foot less than the next appropriate terrain line (map contour interval is 20 feet. The highest contour line identified within a section is 300 feet. The MSL elevation value would be 319 feet).

11.4.6. GPD will raise a warning message whenever 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 source (i.e. DTED1, DTED2, SRTM or DEM in CONUS). After all options are exhausted and there is still no digital terrain coverage in the area, take the following steps to ensure the terrain environment is properly considered;

11.4.6.1. Determine the segment/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"(see **Figure 11.9.**, **Figure 11.10.** and **Figure 11.11.**).

11.4.6.2. Evaluate terrain in the area identified and add obstacles to Data Manager as necessary. Use of VMAP products is authorized (with preference to the best available source as defined in paragraph **11.3.1.2.**) 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/segment being evaluated and the relative position of the area with incomplete terrain coverage. Add horizontal/vertical accuracies equivalent to NGA 1:250,000 JOGs for VMAP1/VMAP2 and equivalent to a WAC chart for VMAP0 (see **Table 11.5.**). After adding obstacles, re-validate segment/sector controlling obstacles for those procedure/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 1*:** Adverse assumption shall be applied between contour lines (see paragraph **11.4.5.4.**). Add vegetation allowance to MSL height as appropriate (see paragraph **11.4.5.3.** Note 2).

***NOTE 2*:** If no VMAP products are available, a terrain analysis must be conducted on paper copy maps and the results documented. CADRG maps are not authorized for this map search (see paragraph **11.1.3.** Note).

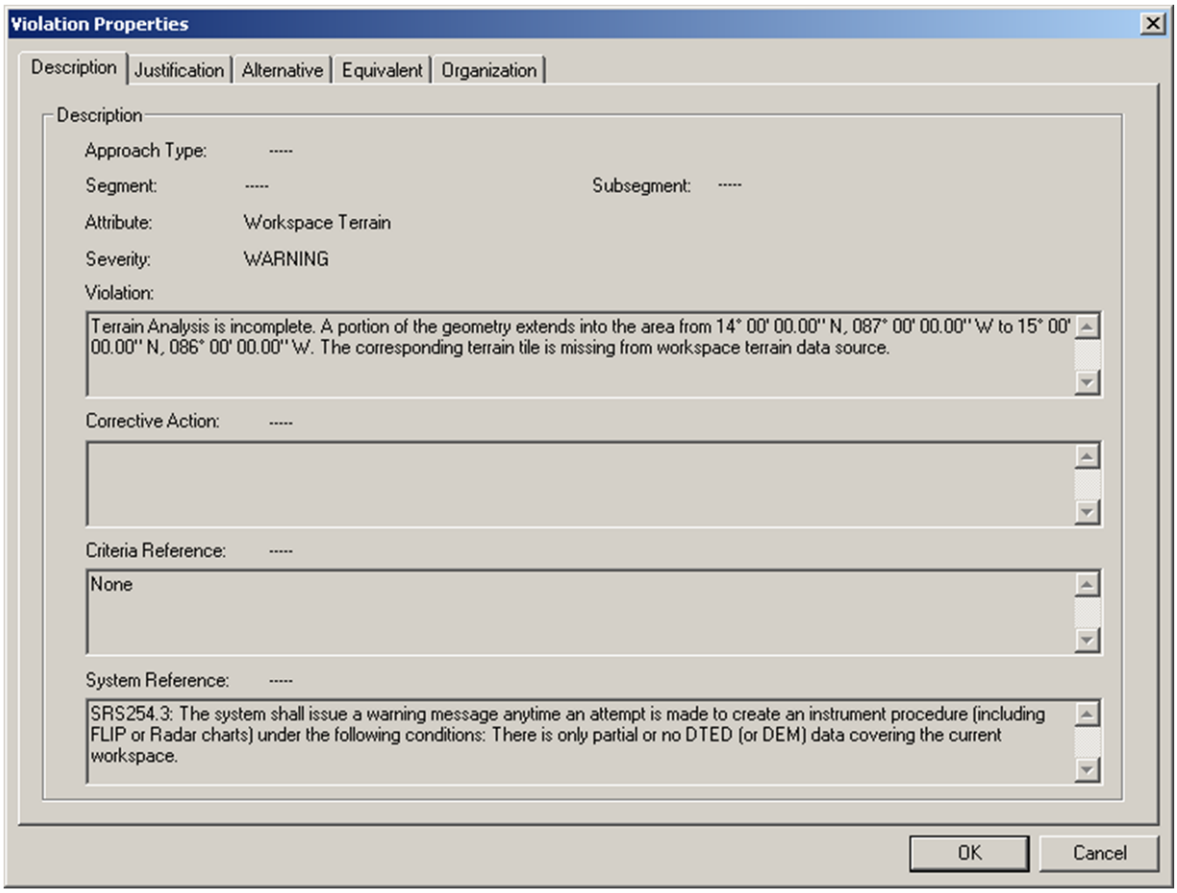
11.4.7. TERPS Development Software Problem Reporting. Timely software problem reporting is essential to ensure flight safety and the software's continued ability to support the USAF TERPS mission. DO NOT attempt to develop local or MAJCOM-specific 'work-arounds'.

11.4.7.1. Responsibilities:

11.4.7.2. The unit shall notify their MAJCOM as soon as they become aware of a suspected problem with the TERPS automation software.

11.4.7.3. MAJCOMs shall validate that the software problem exists and that the problem is not operator induced. Once the MAJCOM has verified the problem as legitimate, the MAJCOM shall immediately notify the AFFSA GPD help desk. Provide the help desk with a full description of the steps that lead to the problem and provide the procedure export package if available.

Figure 11.9. GPD Terrain Analysis Incomplete Warning.



11.4.7.4. MAJCOMs shall provide notification of all TERPS development software problems and solutions, as provided by AFFSA/XOIP, to all users under their command and provide solutions.

Figure 11.10. Area with Missing Terrain Data.

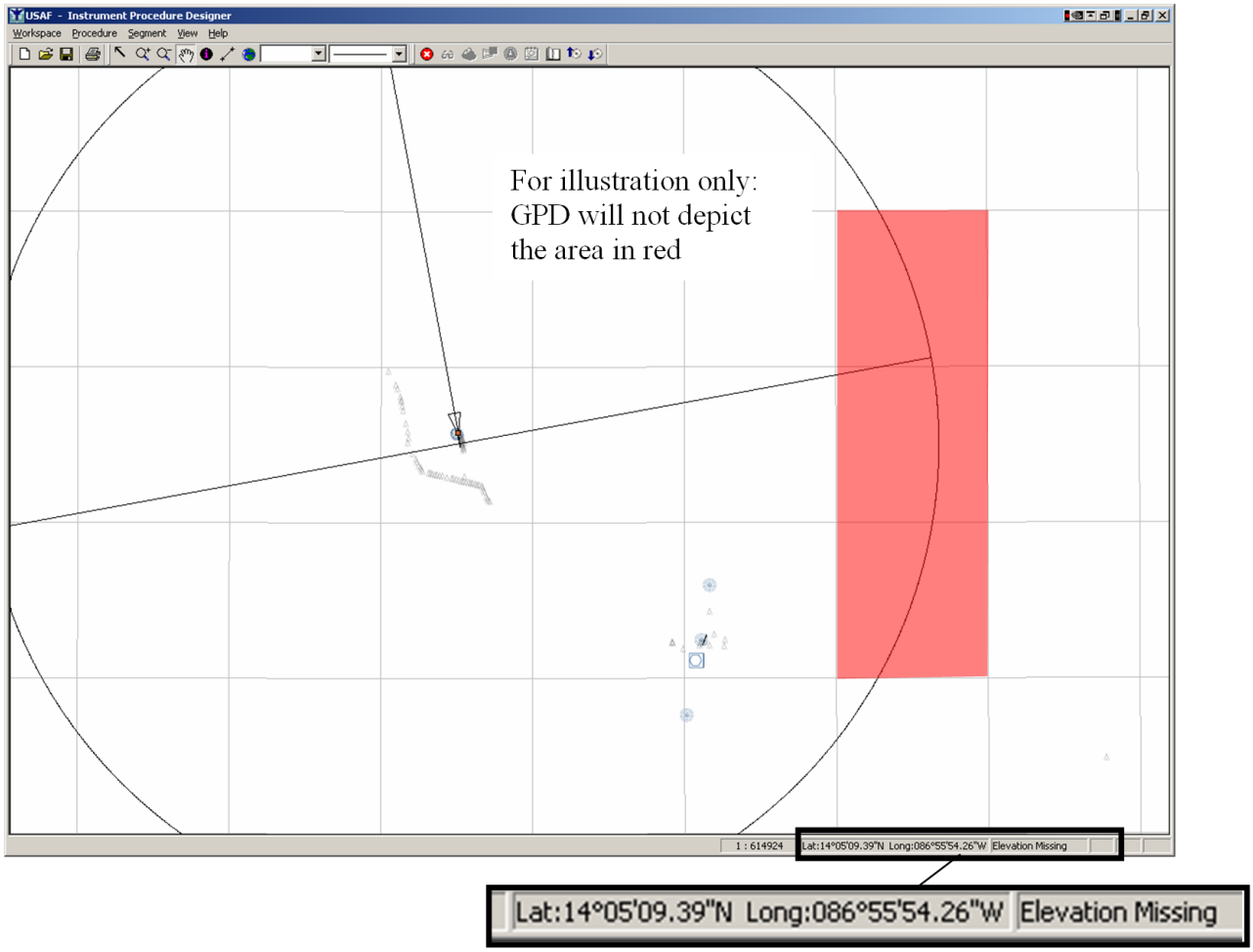
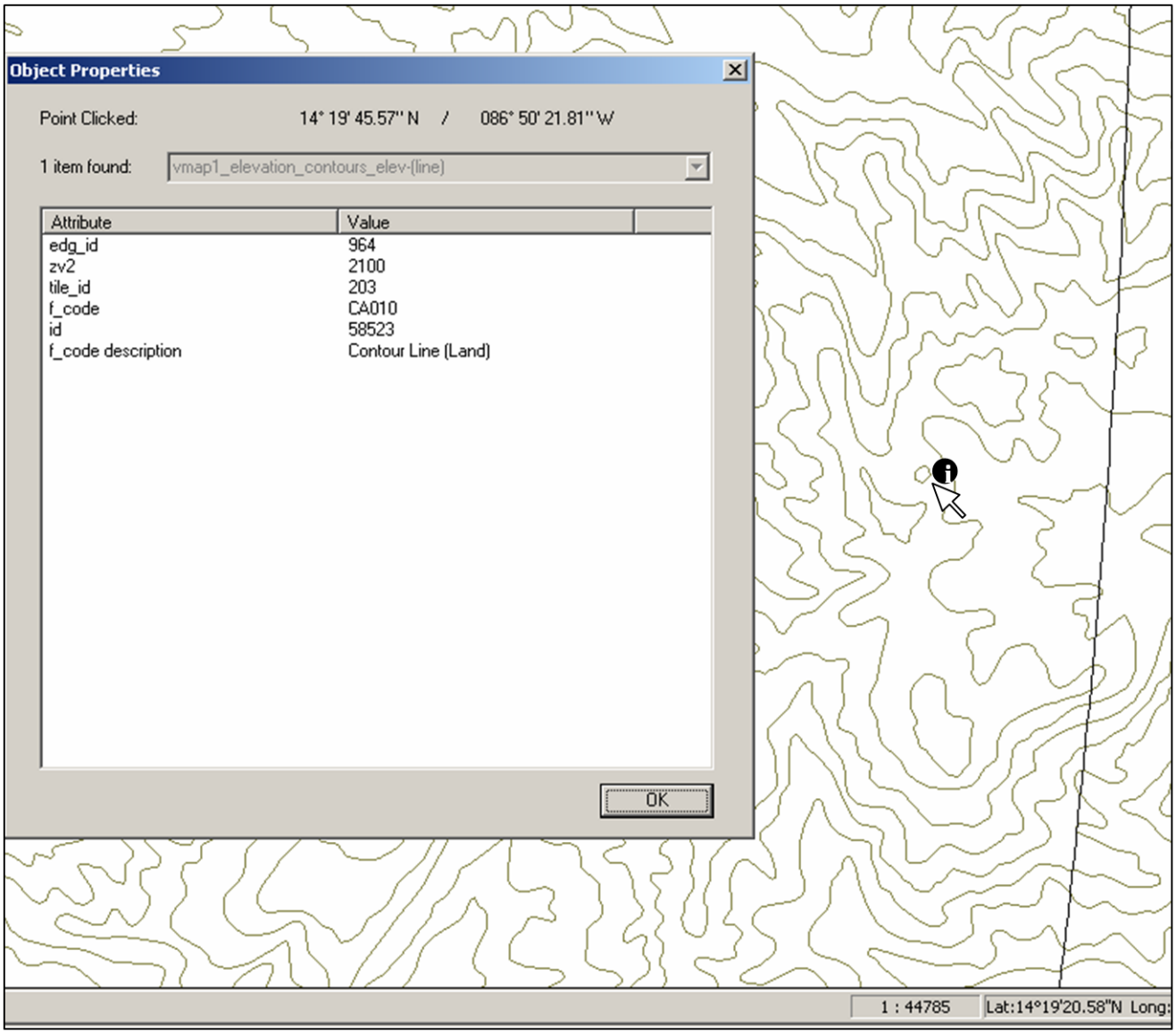


Figure 11.11. Determining the Contour elevation using VMAP.



11.5. DELETED.

11.6. Use of Hand-Held GPS Receivers for Development of Instrument Procedures. Hand-held GPS receivers shall not be used to determine geographic coordinates for instrument procedure development purposes for normal operations. During contingency operations at locations where no usable geodetic data is available, use of a hand-held GPS is permitted only after all other means of obtaining airport/NAVAID source data have been exhausted (DAFIF, Host Nation source, NGA photogrammetric analysis, on-site survey, etc.). Procedures developed using hand-held GPS coordinates are nonstandard. When coordinating the manual aeronautical data changes with the appropriate MAJCOM TERPS function,

clearly identify all data (facility/aerodrome/runway/ obstruction locations, height, etc.) derived from hand-held GPS receivers.

11.7. DELETED.

11.8. DELETED.

11.9. DELETED.

11.10. DELETED.

11.11. DELETED.

Chapter 12

TERPS TRAINING

12.1. Training Responsibilities.

12.1.1. Units with a TERPS responsibility will ensure continuity of TERPS expertise. Primary and alternate (assistant) TERPS specialists shall be designated and attend required formal training. The alternate TERPS specialist should be as knowledgeable and involved in the unit's TERPS activities as the primary specialist.

12.1.2. The primary unit TERPS specialist will provide on the job qualification training for the alternate TERPS specialist(s). When a qualified TERPS specialist is not locally available to provide training, the MAJCOM shall assume or delegate to a TERPS qualified individual from another location, this training responsibility. A qualified TERPS specialist (other than the trainer) who is also a task certifier, must task certify the training.

NOTE: When the MAJCOM assumes or delegates training responsibility, the trainer shall be identified in writing. Maintain a copy of this letter/memo in the trainee's training record. Primary TERPS specialists will involve alternate TERPS specialists to the maximum extent possible in projects to ensure proficiency and project continuity.

12.2. Prescribed Training.

12.2.1. Formal training.

12.2.1.1. All primary and alternate TERPS specialists shall successfully complete required formal training prior to entering qualification training. Formal TERPS training includes course E3AZR1C171 000 and E3OZR13M4 000. Additionally, all primary and alternate TERPS specialist must attend formal USAF GPD training per AFFSA guidance.

12.2.1.2. HQ AFFSA/XOIP manages TERPS course E3AZR1C171 000 and E3OZR13M4 000 curriculum items. These items will constitute the CTS for this course.

12.2.1.3. MAJCOMs manage quotas for these courses according to Education and Training Course Announcements (ETCA).

12.2.2. Qualification Training. Prior to being assigned as a primary TERPS specialist, graduates of the formal TERPS school shall satisfactorily complete all items of the TERPS section in the AFJQS 1C1X1-002.

12.2.3. Specialized Training (GPS, AATCP-1(B), ICAO, Survey, FAA courses, etc.).

12.2.3.1. Specialized training, although not mandatory, is highly recommended.

12.2.3.2. HQ AFFSA/XOIP will identify and approve existing courses, or organize new courses through contractors to ensure such specialized training is made available to MAJCOMs and their units.

12.2.3.3. TERPS specialists with duties involving the design or evaluation of instrument procedures IAW NATO or ICAO standards shall have completed an AFFSA/XOIP approved ICAO PANS-OPS course. Successful completion constitutes qualification training for these standards.

12.2.4. Supplemental Training.

12.2.4.1. Supplemental Training is identified as any particular training received, or any other required training identified by HQ AFFSA/XOIP or MAJCOMs on new criteria, automation, ICs, changes to AFMAN 11-226, etc.

12.2.4.2. Supplemental training shall be documented on an AF IMT 1098 and maintained in the active duty and civilian member's training records.

12.2.5. Recurring/Review Training.

12.2.5.1. Recurring training is training provided to periodically review selected current operational procedures and techniques.

12.2.5.2. Recurring training shall be documented on an AF IMT 1098 and maintained in the active duty and civilian member's training records.

12.2.5.3. Review training is training conducted for the purpose of correcting specific operational deficiencies detected through performance evaluations, supervisory observations, observed trends, etc.

12.2.5.4. Review training shall be documented on an AF IMT 1098 and maintained in the active duty and civilian member's training records.

RONALD E. KEYS, Lt Gen, USAF
DCS, Air & Space Operations

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

NOTE: The following publications are required in the TERPS work area. In some cases, publications listed as "must be accessible within the Air Traffic Control Operation" may also be required in the TERPS work area. For example, if there were Special Use Airspace to consider when developing instrument procedures at your location, FAA Order 7400.8 would be required in the TERPS work area. At overseas locations, MAJCOMs may determine which FAA publications are required in the TERPS work area. When an electronic means (CD-ROM, via LAN, internet, etc.) is available to access these publications, maintaining paper copies in the TERPS work area is not required. Web sites listed below should have the associated publications available for review and/or download.

References

DoD

Chart Updating Manual (CHUM) and CHUM supplements (electronically derived ECHUM data acceptable)

Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design*

(**http://65.204.17.188/report/doc_ufc.html**)

National Imagery and Mapping Agency Catalog of Maps, Charts, and Related Products

NOTE: Electronic versions of the FLIP products listed below may be available at:

(**https://164.214.2.62/products/digitalaero/index.cfm**)

FLIP General Planning (GP) Guide

FLIP Area Planning (AP/1, 1A, 1B; AP/2, 2A; AP/3, 3A; AP/4, as applicable)

Complete set of FLIPs (as applicable)

NATO

NATO Supplement [AATCP-1(B)] to ICAO DOC 8168-OPS/611, Volume II, for the Preparation of Instrument Approach and Departure Procedures (Required at USAF TERPS functions in NATO locations only)

U.S. Air Force

NOTE: Electronic versions of the USAF items listed below may be available at:

(**http://www.e-publishing.af.mil/pubs/majcom.asp?org=AF**)

AFI 11-201, *Flight Information Publications*

AFMAN 11-225, *United States Standard Flight Inspection Manual (FAA Order 8200.1)*

AFMAN 11-226(I), *U.S. Standard for Terminal Instrument Procedures (TERPS) (FAA Order 8260.3)*

AFI 11-230, *Instrument Procedures*

AFMAN 13-215, *ATC Radar Maps and Associated Systems*

AFI 14-205, *Identifying Requirements for Obtaining and Using Geospatial Information and Services*

AFI 32-1042, *Standards for Marking Airfields*

AFI 32-1044, *Visual Air Navigation Systems*

AFI 32-7061, *The Environmental Impact Analysis Process*

AFI 32-7062, *Air Force Comprehensive Planning*

AFI 32-7063, *Air Installation Compatible Use Zone Program*

FAA Orders

NOTE: FAA items listed below with an '*' may be available at:

(**http://av-info.faa.gov/terps/directives%20page.htm**).

FAA Order 7100.9, *Standard Terminal Arrival Program and Procedures*

* FAA Order 7130.3, *Holding Pattern Criteria*

FAA Order 8240.32, *Request for Flight Inspection Service*

(**http://www.naco.faa.gov/index.asp?xml=fioo/faa8240orders**)

FAA Order 8240.36, *Instructions for Flight Inspection Reporting*

(**http://www.naco.faa.gov/index.asp?xml=fioo/faa8240orders**)

FAA Order 8240.47, *Determination of Instrument Landing System (ILS) Glidepath Angle, Reference Datum Heights (RDH), and Ground Point of Intercept (GPI)*
(**http://www.naco.faa.gov/index.asp?xml=fioo/faa8240orders**)

* FAA Order 8260.19, *Flight Procedures and Airspace*

* FAA Order 8260.32, *U.S. Air Force Terminal Instrument Procedures Service*

* FAA Order 8260.38, *Civil Utilization of Global Positioning System (GPS)*

* FAA Order 8260.44, *Civil Utilization of Area Navigation (RNAV) Departure Procedures*

* FAA Order 8260.45, *Terminal Arrival Area (TAA) Design Criteria*

* FAA Order 8260.46, *Departure Procedure (DP) Program*

* FAA Order 8260.48, *Area Navigation (RNAV) Approach Construction Criteria*

* FAA Order 8260.50, *LPV Approach Procedure Construction Criteria*

* FAA Order 8260.51, *United States Standard for Required Navigation Performance (RNP) Instrument Approach Procedure Construction*

NOTE: The following publications must be ***accessible*** within the Air Traffic Control operation.

U.S. Air Force (see **http://www.e-publishing.af.mil/pubs/majcom.asp?org=AF** for the following USAF publications)

AFI 11-202V3, *General Flight Rules*

AFJMAN 11-208, *Department of Defense Notice to Airmen (NOTAM) System*

AFMAN 11-217, *Instrument Flight Procedures (Volumes 1 and 2)*

AFI 13-201, *Air Force Airspace Management*

AFI 13-203, *Air Traffic Control*

AFI 13-204, *Functional Management of Airfield Operations*

AFI 13-213, *Airfield Management*

AFMAN 32-1076, *Design Standards for Visual Air Navigation Facilities*

AFMAN 37-139, *Records Disposition Schedule*

AFI 33-360 Vol. 2, *Content Management Program-Information Management Tool (CMP-IMT)*

FAA Advisory Circulars and Orders

FAA AC 0031, *U.S. National Aviation Standard for the VOR/DME/TACAN Systems*

(**http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/MainFrame?OpenFrameSet**)

FAA Order 7350.7, *Location Identifiers* (**http://www.faa.gov/atpubs/index.htm**)

FAA Order 7610.4, *Special Military Operations* (**http://www.faa.gov/atpubs/index.htm**)

FAA Order 7400.2, *Procedures for Handling Airspace Matters* (**http://www.faa.gov/atpubs/index.htm**)

FAA Order 7400.8, *Special Use Airspace*

FAA Order 7400.9, *Airspace Designations and Reporting Points*

FAA Order 7930.2, *Notice to Airman (NOTAM)* (**http://www.faa.gov/atpubs/index.htm**)

AIM, *Aeronautical Information Manual* (**http://www.faa.gov/ATPubs/AIM/index.htm**)

Title 14 – Code of Federal Regulations (see **http://www.gpoaccess.gov/ecfr/** for the following FARs)

FAR PART 71, *Designation of Federal Airways, Area Low Routes, Controlled Airspace, and Reporting Points*

FAR PART 73, *Special Use Airspace*

FAR PART 93, *Special Air Traffic Rules and Airport Traffic Patterns*

FAR PART 95, *IFR Altitudes*

FAR PART 97, *Standard Instrument Approach Procedures*

NOTE: The following publications should be available for reference at the indicated website.

FAA AC 70/7460-2, *Proposed Construction or Alteration of Objects That May Affect The Navigable Airspace*

(**http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/MainFrame?OpenFrameSet**)

FAA Order VN8200.3, *Policy With Respect To Military Program Procedures For Flight Inspection Of Foreign-Owned Air Navigation Facilities* (**http://avn.faa.gov/index.asp?xml=fioo/avnorders**)

FAA Order 6050.32, *Spectrum Management Regulations and Procedures Manual*

(**http://www.faa.gov/ats/aaf/asr/library/orders.htm**)

FAA Order 8260.23, *Calculation of Radio Altimeter Height* (**http://av-info.faa.gov/terps/directives%20page.htm**)

FAA Order 8260.31, *Foreign Terminal Instrument Procedures*

(**http://av-info.faa.gov/terps/directives%20page.htm**)

IFIM, *International Flight Information Manual* (**http://www.faa.gov/ats/aat/ifim/**)

NOTAMs, *Notices To Airman Domestic/International (Published monthly)* (**http://www.faa.gov/ntap/index.htm**)

FAA Order 8260.40, *Flight Management System (FMS) Instrument Procedures Development*

(**http://av-info.faa.gov/terps/directives%20page.htm**)

FAA Order 8260.42, *Helicopter Global Positioning System (GPS) Nonprecision Approach Criteria*

(**http://av-info.faa.gov/terps/directives%20page.htm**)

Abbreviations and Acronyms

AATCP—Allied Air Traffic Control Publication

AC—Advisory Circular

AC—Airport Obstruction Chart

AFFSA—Air Force Flight Standards Agency

AFREP—Air Force Representative

AGL—Above Ground Level

AICUZ—Air Installation Compatible Use Zone

AIM—Aeronautical Information Manual

AIP—Aeronautical Information Publication

ALS—Approach Lighting System

ANG—Air National Guard

ARA—Airborne Radar Approach

ARP—Airport Reference Point

ASDA—Accelerate – Stop Distance Available

ASIS—Aviation Standards Information System

ASOS—Automatic Surface Observing System

ASR—Airport Surveillance Radar

ATC—Air Traffic Control

ATSEP—Air Traffic System Evaluation Program

AVN—Aviation System Standards (FAA)

BFSL—Best Fit Straight Line

CADRG—Compressed Arc Digitized Raster Graphics

CAT—Category

CATCA—Chief Air Traffic Control Automation

CFACC—Combined Force Air Component Commander

CG—Climb Gradient

CHUM—Chart Updating Manual

CIB—Controlled Image Base

CMDA—Circling Minimum Descent Altitude

CNF—Computer Navigation Fix

CONUS—Continental United States

CTA—Climb To Altitude (associated with 'CG')

DA—Decision Altitude

DAFIF—Digital Aeronautical Flight Information File

DER—Departure End of Runway

DH—Decision Height

DME—Distance Measuring Equipment

DoD—Department of Defense

DP—Departure Procedure

DR—Dead Reckoning

DTED—Digital Terrain Elevation Data

DVA—Diverse Vector Area

DVOF—Digital Vertical Obstruction File

ECHUM—Electronic Chart Updating Manual

ESV—Expanded Service Volume

FAA—Federal Aviation Administration

FAC—Final Approach Course

FAF—Final Approach Fix

FAR—Federal Air Regulations

FIO—Flight Inspection Office

FLIP—Flight Information Publication(s)

FOCA—Floor of Controlled Airspace

FMS—Flight Management System

FTF—Fix-To-Fix

FTIP—Foreign Terminal Instrument Procedure(s)

GCA—Ground Controlled Approach

GIS—Geographic Information Systems

GLS—Global Navigation Satellite System (GNSS) Landing System

GNSS—Global Navigation Satellite System

GPD—Global Procedure Designer

GPI—Ground Point of Intercept

GPS—Global Positioning System

GS—Glide Slope

HAA—Height Above Airport

HAT—Height Above Touchdown

IACC—Inter-Agency Air Cartographic Committee

IAF—Initial Approach Fix

IAP—Instrument Approach Procedure

IAS—Indicated Air Speed

ICAO—International Civil Aviation Organization

IF—Intermediate Fix

IFIO—International Flight Inspection Office

IFR—Instrument Flight Rules

ILS—Instrument Landing System

IM—Inner Marker

IMC—Instrument Meteorological Conditions

IMT—Information Management Tool

INS—Inertial Navigation System

IPB—Instrument Procedure Bulletin

JAA—Joint Aeronautical Authority

JAR-OPS—Joint Aviation Regulation – Operations (ICAO)

JFACC—Joint Force Air Component Commander

KIAS—Knots Indicated Airspeed

LAAS—Low Altitude Alerting System/Local Area Augmentation System

LDA—Localizer type Directional Aid/Landing Distance Available

LLZ—Localizer (ICAO Standard)

LMM—Compass locator at Middle Marker (ILS)

LNAV—Lateral Navigation (without positive vertical guidance)

LOC—Localizer (US Standard)

LOM—Compass locator at Outer Marker ILS

LPV—An approach procedure with vertical guidance based on WAAS electronic lateral and vertical guidance, which does not meet full precision approach standards

MAJCOM—Major Command

MAP—Missed Approach Point

MDA—Minimum Descent Altitude

MEA—Minimum Enroute Altitude

MIFRAC—Minimum IFR Altitude Chart

MLS—Microwave Landing System

MM—Middle Marker

MMLS—Mobile Microwave Landing System

MOC—Master Obstacle Chart

MOCA—Minimum Obstruction Clearance Altitude

MRA—Minimum Reception Altitude

MSA—Minimum Safe Altitude

MSAW—Minimum Safe Altitude Warning

MSL—Mean Sea Level

MV—Magnetic Variation

MVAC—Minimum Vectoring Altitude Chart

NACO—National Aeronautical Charting Office

NAF—Numbered Air Force

NATO—North Atlantic Treaty Organization

NAVAID—Navigational Aid

NAVFIG—Naval Flight Information Group

NDB—Non-Directional Radio Beacon

NFDC—National Flight Data Center

NFPO—National Flight Procedures Office (FAA AVN)

NGA—National Geospatial-Intelligence Agency

NM—Nautical Mile

NoPT—No Procedure Turn Required (procedure turn shall not be executed without ATC clearance)

NOTAM—Notice to Airmen

OCA/H—Obstacle Clearance Altitude/Height

OCONUS—Outside Continental United States

OE/AAA—Obstruction Evaluation/Airport Airspace Analysis

OIS—Obstacle Identification Surface

OROCA—Off-Route Obstruction Clearance Altitude

ORTCA—Off-Route Terrain Clearance Altitude

PANS-OPS—Procedures for Air Navigation Services – Operations (ICAO)

PAR—Precision Approach Radar

PCG—Positive Course Guidance

PCN—Planning Change Notice

PIDP—Programmable Indicator Data Processor

PRM—Precision Runway Monitor

PV—Prevailing Visibility

QFE—Altimeter Setting above station

QNE—Altimeter Setting of 29.92 inches that provides height above a defined standard datum plane

QNH—Altimeter Setting that provides height above mean sea level

RADAR—Radio Detection and Ranging

RNAV—Area Navigation

RNP—Required Navigation Performance

ROC—Required Obstacle Clearance

RPI—Runway Point of Intercept

RVR—Runway Visual Range

RWY—Runway

SAR—Special Administrative Region

SARPS—Standards and Recommended Practices (ICAO)

SDF—Simplified Directional Facility

SER—Start End of Runway

SIAP—Standard Instrument Approach Procedure

SID—Standard Instrument Departure

SM—Statute Mile

SRE—Surveillance Radar Element of GCA (Instrument Approach Procedures Identification only - ICAO)

SSM—Side-Step Maneuver

STAR—Standard Terminal Arrival

STOL—Short Take-off and Landing

SUA—Special Use Airspace

TA—Transition Altitude

TACAN—Tactical Air Navigation equipment

TAS—Terminal Amendment System

TAS—True Airspeed

TCH—Threshold Crossing Height

TCN—Terminal Change Notice

TDZ—Touchdown Zone

TDZE—Touchdown Zone Elevation

TERPS—Terminal Instrument Procedures

THRE—Threshold elevation

TILS—TERPS Instruction Letters (FAA)

TLE—TERPS Liaison Element

TLS—Transponder Landing System

TLv—Transition Level

TODA—Take-off Distance Available

TORA—Take-off Run Available

TPC—Tactical Pilotage Chart

UCN—Urgent Change Notice

USAADE—United States Army Aeronautical Detachment Europe

USAASA—United States Army Aeronautical Services Agency

UVMAP—Urban Vector Map

VCOA—Visual Climb Over Airport

VDP—Visual Descent Point

VMAP—Vector Map

VMC—Visual Meteorological Conditions

VNAV—Vertical Navigation

VOR—Very High Frequency Omni-Directional Range Station

VORTAC—VOR and TACAN Navigation Facilities - collocated

V/V—Vertical Velocity

WAAS—Wide Area Augmentation System

WAC—World Aeronautical Chart

WGS—World Geodetic System

WIE—With Immediate Effect

WPT—Waypoint (RNAV)

Terms

NOTE: For additional terms, refer to the glossaries in AFMAN 11-226(I), FAA Order 7110.65, and *Flight Information Publication (FLIP)*, General Planning.

Air Force Flight Standards Agency (AFFSA)—USAF level agency responsible for the day-to-day management of the USAF Terminal Instrument Procedure Program.

Annual Audit—An audit conducted annually to identify each instrument procedure and validate the need for each, i.e., ensure each procedure is still meeting mission requirements. The annual audit also validates whether or not waivers to TERPS criteria are still required or have not expired; some may not be required any longer due to changes in criteria.

Final Approval Authority—Designated individual or agency that guarantees an instrument procedure meets all criteria as stipulated in AFMAN 11-226(I), NATO AATCP-1(B), this AFI, and other applicable directives. This authority also ensures the procedure package is complete as outlined in paragraph **5.3.4.** of this instruction.

Flight Inspection—An inspection conducted in accordance with AFJMAN 11-225**,** *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/or MAJCOM TERPS for tracking and updating instrument procedures; includes the Annual Audit.

FLIP Review—An in-depth check of the planview, profile, minima block, radar minimums, and airport sketch ensuring published information mirrors the procedure package. This review includes loose-leaf and locally published FLIPs and CE Comprehensive Planning Maps to verify changes.

Flyability Check—An airborne check normally accomplished by the flying unit requesting the procedure to determine if a procedure is operationally acceptable.

High Altitude Instrument Procedure—Terminal instrument procedure that usually begins (approach) or ends (departure) at or above 18,000 feet mean sea level (MSL). The beginning/ending altitude may be lower to achieve compatibility with airspace constraints and optimum traffic flows.

Low Altitude Instrument Procedure—Terminal instrument procedure that usually begins (approach) or ends (departure) below 18,000 feet MSL.

MAJCOM Review—An in-depth review of a new or revised instrument procedure performed by a MAJCOM TERPS authority or AFFSA/XOIP. 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 this review signifies completion of the MAJCOM Review by signing the appropriate record in a designated location.

Nonstandard Procedure—An instrument procedure that deviates from the criteria or requirements of this instruction, or AFMAN 11-226(I), or NATO AATCP-1(B), or any approved supplements to these documents.

Obstacle Shadowing—When the elevation of an obstacle, in an obstacle evaluation section, is equal to or greater than the section before (closer to ARP), the obstacle lower and further from the ARP is considered "shadowed."

Procedure Package—A collection of documentation that was 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 aeronautical information publications (AIP).

Public-Use Procedure—An instrument procedure that may be used by any agency or person.

Restricted-Use Procedure—An instrument procedure limited in use; 'USAF ONLY' or 'NOT FOR CIVIL USE'.

Segment Review—A process in which properly constructed TERPS areas and/or any other areas associated with the procedure are evaluated to ensure proper obstacle clearance.

Screen Height—Runway end crossing height.

Special Use Procedure—An operationally required instrument procedure that is not published in FLIP.

Standard Procedure—An instrument procedure that conforms to the criteria and requirements of this instruction, or AFMAN 11-226(I), or NATO AATCP-1(B), or any approved supplements to these documents.

Terminal Instrument Procedure—Any procedure designed for instrument approach or departure of aircraft to or from an airport or point in space (for example, non-precision and precision approaches and standard instrument departures).

Attachment 2

EQUIVALENT REPORTABLE WEATHER VALUES

(Source: FMH-No. 1)

CEILING		RVR		PREVAILING VISIBILITY (PV)	
FEET	**METERS**	**FEET**	**METERS**	**SSM**	**METERS**
100	30	600	180	1/8	200
200	60	800	240	1/4	400
300	90	1,000	300	3/8	600
400	120	1,200	370	1/2	800
500	150	1,400	420	5/8	1,000
600	180	1,600	490	3/4	1,200
700	210	1,800	550	7/8	1,400
800	240	2,000	610	1	1,600
900	270	2,200	670	1 1/8	1,800
1,000	300	2,400	730	1 1/4	2,000
1,100	330	2,600	790	1 3/8	2,200
1,200	360	2,800	850	1 1/2	2,400
1,300	390	3,000	910	1 5/8	2,600
1,400	420	3,200	970	1 3/4	2,800
1,500	450	3,400	1,030	1 7/8	3,000
1,600	480	3,500	1,070	2	3,200
1,700	510	3,600	1,100	2 1/4	3,600
1,800	540	3,800	1,160	2 1/2	4,000
1,900	570	4,000	1,220	2 3/4	4,400
2,000	600	4,500	1,370	3	4,800
2,100	630	5,000	1,520	4	6000
2,200	660	5,500	1,670	5	8000
2,300	690	6,000	1,830	6	9000
2,400	720			7 and above	9999
2,500	750				
2,600	780				
2,700	810				
2,800	840				
2,900	870				
3,000	900				
3,100	930				
3,200	960				
3,300	990				
3,400	1,020				
3,500	1,050				
3,600	1,080				
3,700	1,110				
3,800	1,140				
3,900	1,170				
4,000	1,200				
4,100	1,230				
4,200	1,260				
4,300	1,290				
4,400	1,320				
4,500	1,350				
4,600	1,380				
4,700	1,410				
4,800	1,440				
4,900	1,470				
>5000 but <10,000	Nearest 500’				
>10,000	Nearest 1000’				

Attachment 3

INSTRUMENT PROCEDURE CRITERIA

NOTE: This attachment clarifies and expands criteria that are not complete or are open to interpretation in AFMAN 11-226(I), *Terminal Instrument Procedures (TERPS)* and *NATO Allied Air Traffic Control Publication-1B* [AATCP-1(B)], *Criteria for the Preparation of Instrument Approach and Departure Procedures*. Use this attachment with AFMAN 11-226(I) and AATCP-1(B). When there is any conflict between this and the TERPS documents, the criteria here govern.

A3.1. AFMAN 11-226(I), Volume 1.

A3.1.1. Paragraph 5a(3); Circling (Added). Circling procedures shall not be designed for use with precision instrument approach procedures.

NOTE 1: This does not apply to host nation locations where the country has authorized circling from a precision procedure that does not have an accompanying non-precision procedure (i.e., ILS and Circling Minima without Localizer minima).

NOTE 2: Circling procedures are appropriate when localizer minima are authorized (see AFMAN 11-217, Chapter 15, *Circling Approaches,* for aircrew guidance).

A3.1.2. Paragraph 122a; Approval, Airport. This paragraph refers to FAA AC 150/5340-1, Marking of Paved Areas on Airports, and AC 150/5300-13, Airport Design. Use AFI 32-1042, *Standards for Marking Airfields*, and Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design* in lieu of these FAA Advisory Circulars. Additionally, AFI 32-1044, *Visual Air Navigation Systems*, and AFMAN 32-1076, *Design Standards For Visual Air Navigation Facilities*, contain guidance found in these FAA Advisory Circulars. Non-compliance with these Civil Engineering directives may require a waiver approval through appropriate CE channels and do not require a TERPS waiver.

A3.1.3. Paragraph 141; Nonstandard Procedures. Process waivers for military procedures according to this instruction.

A3.1.4. Paragraph 142; Changes. Process all non-procedural changes according to FLIP GP, **Chapter 11**; unit level TERPS functions shall provide a copy of the non-procedural change to their MAJCOM TERPS office. Process procedural changes through channels per paragraph **6.2.** in this AFI.

A3.1.5. Paragraph 150d; Coordination, Airspace Actions. Ensure all instrument procedures primary obstruction clearance areas are within controlled airspace in the United States and where required by host nation regulations. The following criteria apply:

A3.1.5.1. Altitudes or heights established must be at least 300 feet above the floor of Class E Airspace, except that these altitudes or heights may be rounded to the nearest 100 feet. Outside the United States, procedures must be contained within controlled airspace according to host nation criteria.

A3.1.5.2. Outside of Class D airspace (and extensions) and Class E airspace, use air traffic control IFR lateral separation standards. (See FAA Order 7110.65, Chapters 5 and 6)

A3.1.5.3. In Class D airspace (and extensions) and Class E airspace, use the criteria in FAA Order 7400.2 and FAA Order 8260.19, or the TERPS primary obstacle clearance area, whichever is greater.

NOTE: AFI 13-201, Air Force Airspace Management, contains procedures for processing airspace actions.

A3.1.6. Paragraph 161; Straight-In Procedure Identification. If DME and RADAR identify the FAF, add "RADAR OR DME REQUIRED" in the plan view of the procedure. This applies to any equipment required (ADF OR DME REQUIRED, ADF OR RADAR REQUIRED, etc.).

A3.1.7. Paragraph 163; Differentiation. At USAF locations where both high and low altitude instrument approach/departure procedure are published in the same DoD FLIP, a procedure can be identified as a HI/LO procedure, e.g., HI/LO TACAN or VOR/DME Rwy 36. The procedure will be crosshatched along the upper left half of the top border and along the lower right half of the bottom border. The procedure will contain Category A-E minimums.

A3.1.8. Paragraph 211; Positive Course Guidance (PCG). When Positive Course Guidance is available, it shall be used to develop Missed Approach segments. When ATC radar is available, radar may be used as positive course guidance and the following note shall be published on the Approach/Departure Procedure: "RADAR REQUIRED."

A3.1.9. Paragraph 215; Controlling Obstacle(s). Controlling obstacles have traditionally been the single highest obstacles in a segment or the one with the greatest amount of OCS penetration. However, advances in USAF TERPS automation, including the use of DTED Level 1/2/SRTM and DVOF, will virtually assure that there will be multiple obstructions with the same altitude or an equal amount of OCS penetration identified during instrument procedure segment construction. Apply the guidance in this paragraph to determine which obstacle will be identified as the controlling obstacle.

NOTE: "Obstacle" in this context includes both terrain and man-made features. Adjustment for vertical and horizontal accuracies will be added to man-made structures prior to identifying the controlling obstacle. The value of the reported/user declared vertical accuracy will be added to the MSL elevation of the obstacle. For horizontal adjustments, the greater of either the reported/user declared horizontal accuracy or the accuracy of the geodetic coordinates will be considered, in effect creating an three-dimensional cylinder of a specified height and radius.

A3.1.9.1. Equivalent/Effective Height. Obstacles in the secondary area may be higher than obstacles in the primary area and result in the same segment minimum altitude, therefore it's height is effectively reduced by the amount of secondary surface rise. This is the obstacles 'equivalent height'. When specified, an object's height is effectively increased by the amount of it's vertical accuracy. This is the obstacles effective height. Obstacles with vertical accuracy specified in the secondary have an effective height equal to it's MSL + vertical accuracy – secondary rise.

NOTE: Even though the precision final segment X area is technically considered primary area, an effective height is determined for both the X and Y surfaces. The effective height is determined by the obstacle's MSL elevation, minus the amount of X and/or Y surface rise (combined, if applicable) from the edge of the W surface.

A3.1.9.2. Segment/Subsegment. For the purposes of this paragraph, a procedure segment/subsegment generally starts at the fix/point encountered first as the procedure is flown and ends at the fix/point marking the beginning of the next segment.

Example 1: A non-precision 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/point.

A3.1.9.3. Feeder Route/Initial Approach/Intermediate Segment/Non-Precision Final Segments. Select the Controlling Obstacle in the following order:

A3.1.9.3.1. Segments/subsegments other than Procedure Turn and Hold in Lieu of Procedure Turn;

A3.1.9.3.1.1. Select the obstacle with the highest height/effective height.

A3.1.9.3.1.2. When multiple obstacles have the same height, select the obstacle closest to the end of segment line along the flight track (measured parallel to the runway centerline).

A3.1.9.3.1.3. When multiple obstacles are the same distance from the end of a segment, select the obstacle closest to the runway centerline (measured perpendicular to the centerline).

A3.1.9.3.2. Procedure Turn segments/subsegments;

A3.1.9.3.2.1. Select the obstacle with the highest height/effective height.

A3.1.9.3.2.2. When multiple obstacles have the same height, select the obstacle closest to the Procedure Turn Fix.

A3.1.9.3.2.3. When multiple obstacles are the same distance from the Procedure Turn Fix, select the obstacle closest to the inbound course line.

A3.1.9.3.3. Hold in Lieu Of A Procedure Turn segments/subsegments;

A3.1.9.3.3.1. Select the obstacle with the highest height/effective height.

A3.1.9.3.3.2. When multiple obstacles have the same height, select the obstacle closest to the Holding Fix.

A3.1.9.3.3.3. When multiple obstacles are the same distance from the holding fix, select the obstacle closest to the inbound course line.

A3.1.9.4. Precision Final Segment. Select up to three controlling obstacles, as applicable.

A3.1.9.4.1. Controlling Obstacle 1. When multiple obstacles penetrate a W, X, or Y OCS, identify the obstacle that requires the highest Decision Altitude in the following order;

A3.1.9.4.1.1. Select the penetrating obstacle with highest height/effective height above Approach Surface Base Line (ASBL).

A3.1.9.4.1.2. When multiple obstacles have the same height/effective height above ASBL, select the obstacle closest to the runway threshold (measured parallel to the runway centerline).

A3.1.9.4.1.3. When multiple obstacles are the same distance from the runway threshold, select the obstacle closest to the runway centerline (measured perpendicular to the centerline).

A3.1.9.4.2. Controlling Obstacle 2. Always identify the obstacle requiring the highest Glide Path Angle (GPA) in the following order:

A3.1.9.4.2.1. The obstacle requiring the greatest GPA, applying the formula

$$102 \div \frac{1}{\left[\frac{E}{(D-(200+d)}\right]} = \text{GPA}$$

Where: E = Obstacle Effective Height Above ASBL

D = Obstacle Distance from threshold

d = 954 – GPI (Vol. 3 para 3.2.1)

A3.1.9.4.2.2. When multiple obstacles produce the same GPA, select the obstacle closest to the runway threshold (measured parallel to the runway centerline).

A3.1.9.4.2.3. When multiple obstacles are the same distance from the runway threshold, select the obstacle closest to the runway centerline (measured perpendicular to the centerline).

A3.1.9.4.3. Controlling Obstacle 3. When multiple obstacles penetrate a W, X, or Y OCS, identify the obstacle that requires the greatest amount of threshold displacement in the following order;

A3.1.9.4.3.1. Identify the obstacle with the greatest amount of OCS penetration.

A3.1.9.4.3.2. When multiple obstacles have the same amount of OCS penetration, select the obstacle closest to the runway threshold (measured parallel to the runway centerline).

A3.1.9.4.3.3. When multiple obstacles are the same distance from the runway threshold, select the obstacle closest to the runway centerline (measured perpendicular to the centerline).

A3.1.9.5. Non-precision 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.

A3.1.9.5.1. Missed approach OCS evaluation (including ‘Climb-In-Hold’ obstacles).

A3.1.9.5.1.1. When multiple obstacles penetrate the OCS, identify the controlling obstacle in the following order;

A3.1.9.5.1.1.1. Select the obstacle that requires the highest climb gradient to remove the penetration.

A3.1.9.5.1.1.2. When multiple obstacles require the same climb gradient, select the obstacle that causes the highest ‘Climb-To’ altitude.

A3.1.9.5.1.1.3. When multiple obstacles have the same ‘Climb-To’ altitude, select the obstacle closest to the runway centerline.

A3.1.9.5.1.2. When no penetrating obstacles exist, identify the controlling obstacle in the following order;

A3.1.9.5.1.2.1. Select the obstacle with the elevation that comes closest to penetrating the OCS.

A3.1.9.5.1.2.2. When multiple obstacles are equally close to penetrating the OCS, select the obstacle that is farthest away from the missed approach point (MAP), using the appropriate method for measuring this distance.

NOTE: The obstacle farthest from the MAP is selected since this can be equated to the obstacle that would require the highest 'climb-to' altitude when a penetration exists.

A3.1.9.5.1.2.3. When multiple obstacles are the same distance from the MAP, select the obstacle closest to the runway centerline.

A3.1.9.5.2. Minimum missed approach obstruction altitude; select the controlling obstacle in the following order;

A3.1.9.5.2.1. Identify the obstacle within the missed approach area with the highest height/effective height.

A3.1.9.5.2.2. When there are multiple obstacles with the same height/effective height, select the obstacle closest to the MAP using the appropriate method for measuring distance.

A3.1.9.5.2.3. When there are multiple obstacles the same distance from the MAP select the obstacle closest to the runway centerline.

A3.1.9.5.3. Minimum missed approach holding; select the controlling obstacle in the following order;

A3.1.9.5.3.1. Select the obstacle with the highest height/effective height.

A3.1.9.5.3.2. When there are multiple obstacles with the same height/effective height select the obstacle closest to the holding fix.

A3.1.9.5.3.3. When there are multiple obstacles the same distance from the holding fix select the obstacle closest to the inbound course line.

A3.1.9.6. Precision Missed Approach. Controlling obstacles are identified separately for Section 1, Section 2, minimum missed approach obstruction altitude and minimum holding altitude.

A3.1.9.6.1. Section 1. Select the controlling obstacle in the following order;

A3.1.9.6.1.1. When penetrating obstacles exist, select the obstacle that requires the highest Decision Altitude.

A3.1.9.6.1.2. When no penetrating obstacles exist, select the obstacle with the elevation that comes closest to penetrating the OCS.

A3.1.9.6.1.3. When multiple obstacles are equally close to penetrating the OCS, select the obstacle closest to the Decision Altitude point (measured parallel to the runway centerline).

A3.1.9.6.1.4. When multiple obstacles are the same distance from the Decision Altitude point, select the obstacle closest to the runway centerline (measured perpendicular to the centerline).

A3.1.9.6.2. Section 2 (including ‘climb-in-hold’ obstacles). Select the controlling obstacle in the following order;

A3.1.9.6.2.1. When penetrating obstacles exist:

A3.1.9.6.2.1.1. Select the obstacle that requires the highest climb gradient to remove the penetration.

A3.1.9.6.2.1.2. When multiple obstacles require the same climb gradient, select the obstacle with the highest "climb-to" altitude.

A3.1.9.6.2.1.3. When multiple obstacles have the same "climb-to" altitude, select the obstacle closest to the runway centerline.

A3.1.9.6.2.2. When no penetrating obstacles exist:

A3.1.9.6.2.2.1. Select the obstacle with the elevation that comes closest to penetrating the OCS.

A3.1.9.6.2.2.2. When multiple obstacles are equally close to penetrating the OCS, select the obstacle that is farthest away from the Section 1 termination point using the appropriate method for measuring that distance.

A3.1.9.6.2.2.3. When multiple obstacles are the same distance from the Section 1 termination point, select the obstacle closest to the runway centerline.

A3.1.9.6.3. Minimum missed approach obstruction altitude; select the controlling obstacle in the following order;

A3.1.9.6.3.1. Select the obstacle within the Missed Approach area with the highest height/effective height.

A3.1.9.6.3.2. When there are multiple obstacles with the same height/effective height;

A3.1.9.6.3.2.1. Section 1. Select the obstacle closest to the Decision Altitude point.

A3.1.9.6.3.2.2. Section 2. Select the obstacle closest to the Section 1 termination point using the appropriate method for measuring this distance.

A3.1.9.6.3.2.3. When there are multiple obstacles meeting the above criteria, select the obstacle closest to the runway centerline.

A3.1.9.6.4. Minimum Holding Altitude. Select the controlling obstacle using the same method as for non-precision missed approach in paragraph **A3.1.9.5.**.

A3.1.9.7. Departures. Select the obstacle that requires the highest climb gradient and is closest to the departure end of the runway.

A3.1.9.8. ESA/MSA or ATC Charts sectors/TAA right/left base, straight in areas.

A3.1.9.8.1. Select the obstacle either in the sector/area or buffer (if applicable) which results in the greatest minimum sector/area altitude.

A3.1.9.8.2. When there are multiple obstacles that result in the same minimum sector/area altitude, the controlling obstacle is the one inside the sector/area boundary (as opposed to the buffer area) and closest to the origin (center of chart, or appropriate waypoint).

A3.1.9.8.3. When there are multiple obstacles resulting in the same minimum sector altitude but all are in the sector/area buffer, the controlling obstacle is the one closest to the sector/area edge.

A3.1.10. Paragraph 220; Feeder Routes. Do not construct feeder routes containing a turn point defined by a fix between the feeder facility and the IAF.

A3.1.11. Paragraph 221; Minimum Safe/Sector Altitudes (MSA). Comply with this paragraph 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. This will only be accomplished after the procedure specialist has coordinated with all concerned agencies.

A3.1.12. Paragraph 230, Initial Approach Segment. The Initial Approach segment may be made up of a single segment or a series of subsegments. Each subsegment can be a straight course or radial, an arc, a procedure turn, a teardrop turn, penetration turn, a course reversal based on non-collocated facilities, a hold in lieu of a procedure turn or a dead reckoning subsegment.

A3.1.12.1. The length of the subsegment that follows the IAF shall be at least twice the fix error that follows the fix (see AFMAN 11-226(I), Vol. 1, Paragraph 287a and Figure 29).

A3.1.12.2. Stepdown fixes may or may not correspond to the fixes that define the subsegments of the Initial Approach Segment. If stepdown fixes are specified, AFMAN 11-226(I), Vol. 1, Paragraph 288c shall apply.

A3.1.12.3. When stepdown fixes are specified, the controlling obstacle and minimum altitude for the portion prior to and after the stepdown fix shall be identified.

A3.1.12.4. The total length of all subsegments combined may not exceed 50 NM unless an operational requirement exists.

A3.1.12.5. When the turn between initial subsegments exceeds 90 degrees, a radial or bearing which provides at least 2 NM lead shall be identified.

A3.1.12.6. When altitudes are specified at the fixes marking both the beginning and end of a segment/subsegment (to include stepdown fixes), initial descent gradient criteria shall be applied in that segment/subsegment.

A3.1.12.7. Straight and Arc Courses. The turn between a straight or arc subsegment and the following subsegment shall not exceed 120 degrees. Turns greater than 120 degrees require a course reversal subsegment.

A3.1.12.8. Course Reversals. Straight or arc subsegment(s) may precede a course reversal subsegment (procedure turn, high altitude teardrop penetration turn, course reversal based on non-collocated facilities or holding in lieu of procedure turn). However, the course reversal subsegment must be the last subsegment encountered prior to reaching the intermediate of final approach segment.

NOTE: This restriction does not apply when AFMAN 11-226(I), Vol. 1, paragraph 244e(1) is applied.

A3.1.12.8.1. Procedure Turn. When a subsegment precedes the procedure turn, use the Initial Approach Fix (IAF) crossing altitude when applying AFMAN 11-226(I), Vol. 1, para 234b and Table 1 to determine the PT primary area dimensions.

A3.1.12.8.2. High Altitude Teardrop Penetration Turn. When determining the penetration turn distance/divergence from AFMAN 11-226(I), Vol. 1, Paragraph 235b, and Table 2, do not consider the altitude loss in the subsegment prior to the penetration turn fix/facility. Delay before descent shall only be applied from the penetration turn fix/facility.

A3.1.12.8.3. Hold-in-lieu-of Procedure Turn. The minimum holding subsegment altitude shall be no lower than the IAF crossing altitude of the preceding subsegment (when specified).

A3.1.12.9. Dead Reckoning. A dead reckoning subsegment must be the last subsegment encountered prior to reaching the intermediate or final approach segment.

A3.1.13. Paragraph 231; Altitude Selection. The altitude selected shall not be below the teardrop completion altitude where a teardrop is required.

A3.1.14. Paragraph 232a[1]; Initial Approach Segments Based on Straight Course and Arcs With Positive Course Guidance, Alignment, Courses. Also apply this paragraph when both segments are initial segments.

A3.1.15. Paragraph 232a[2]; Initial Approach Segments Based on Straight Course and Arcs With Positive Course Guidance, Arcs, Table 1. When a 15 NM arc is used, the OPTIMUM descent gradient is 800 feet per nautical mile.

A3.1.16. Paragraph 232b. Apply this paragraph to include the following: 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.

A3.1.17. Paragraph 234d, Initial Approach Segment Based on PT. Apply this paragraph with the following addition: The altitude required for increasing the limits and maneuvering zone shall be rounded up to the next mile; i.e., if the required altitude is 310', then it shall be rounded up to 400 feet, thus requiring 2 miles additional distance for the limit and maneuvering zone.

A3.1.18. 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, procedure turn or other initial segment criteria shall be used.

NOTE: 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.

A3.1.19. Paragraph 235b; Initial Approach Based on High Altitude Teardrop Penetration. Apply this paragraph, with the statement "altitude to be lost in the procedure" referencing the portion of the approach procedure from the IAF to the IF vs. the entire length of the procedure from IAF to MAP.

A3.1.20. Paragraph 243. Application of this paragraph is not authorized.

A3.1.21. Paragraph 252; Descent Angle/Gradient. Construct nonprecision approaches to provide a descent angle that is coincident with the associated VGSI angle. If this is not possible, publish the following note in the profile view of the procedure: 'VGSI and descent angles not coincident.'

A3.1.21.1. Do not publish a descent angle/gradient for ASR approaches.

A3.1.21.2. The Vertical Path Angle (VPA) and TCH shall not be published for the LOC portion of a precision approach. The angle and TCH for the ILS glideslope portion will be published as it always has.

A3.1.22. Paragraph 253; Visual Descent Point (VDP). With the exception of ASR approaches, establish a VDP for all straight in non-precision procedures.

NOTE: Procedures outside CONUS (i.e., Host Nation procedures and military bases applying AATCP-1(B) criteria), exceptions may apply.

A3.1.22.1. A VDP fix can be less than one mile from a step-down fix or missed approach point, provided chart clarity is not compromised.

A3.1.22.2. When a VDP cannot be published, document the reason in the user entered notes/ procedure package.

A3.1.23. Paragraph 261; Circling Approach Area Not Considered for Obstacle Clearance. When a sector is eliminated from the obstacle clearance area (e.g., "Circling NA West of Rwy 18-26"), expand the obstacle clearance area to include a portion of the sector eliminated. The expanded portion of the obstacle clearance area will begin 500 feet down the runway (from the threshold) on the centerline. It will splay $\pm$ 10° either side of runway centerline and extend outward to the maximum circling distance. See **Figure A3.1.**

A3.1.24. Paragraph 270; Missed Approach Segment. When developing missed approaches for PAR or ASR procedures, it is not necessary to use "non-radar" NAVAIDs. These radar missed approaches should be the same as normal climbout instructions, if possible, to get the aircraft back to minimum vectoring altitude for another approach or headed to an alternate airfield.

A3.1.25. Paragraph 272; MAP. A crossing radial may be used to define a missed approach point. When using this option, the procedure will be considered nonstandard and requires waiver processing IAW paragraph **5.5.**. Maximum acceptable fix error is 1/2 mile for a crossing radial.

NOTE: When considering missed approach point locations using a DME fix or a crossing radial, the MAP shall be identified at or prior to the first usable landing surface. The MAP may be identified as the on-airport NAVAID only when no usable/satisfactory DME fix or crossing radial is available.

A3.1.26. Paragraph 274; Straight Missed Approach Obstacle Clearance. In addition, note that instances may occur when an obstacle penetrates the 40:1 precision or non-precision missed approach surface and other solutions (e.g., DA adjustments) are not feasible. An equivalent level of safety may be achieved by selecting a climb gradient that matches a missed approach surface that clears the obstacle. When using this option, the procedure will be considered nonstandard and requires waiver processing IAW paragraph **5.5.**. Required minimum climb rate information must be graphically displayed on the procedure. The altitude or fix to which the climb gradient must be maintained must be published.

NOTE: A climb gradient required for Air Traffic Control purposes or to prevent a climb-in-holding situation at the end of the missed approach segment shall be considered nonstandard and processed IAW paragraph **5.5.** (Also see AFMAN 11-226(I), Volume 1, paragraph 141).

A3.1.27. Paragraph 276b; Turning Missed Approach Obstacle Clearance; More Than 90° Turn. Zone 3 only extends to the edge of the secondary area, and then extends perpendicular to the missed approach course into the secondary.

A3.1.28. Paragraph 282; Course/Distance Fixes. In addition, describe in nautical miles when a "fly-off" (level flight) is maintained from the primary facility or fix, before the beginning of the penetration/procedure turn or descent. Depict the beginning of the penetration/procedure turn or descent on the planview and profile by DME values when available.

A3.1.29. Paragraph 288c3. Comply with paragraph to include, altitude shall be rounded to the nearest 20 or 100 foot increment.

A3.1.30. Paragraph 289b. Apply this paragraph to include the following: Measure the distance of the obstacle in the secondary area perpendicular to the final approach course.

A3.1.31. Paragraph 310; Do not establish or publish alternate minima for Air Force procedures.

NOTE: Alternate minima are given in AFI 11-202, Volume 3, General Flight Rules, or as supplemented by each MAJCOM.

A3.1.32. Paragraph 323c; Minimums Adjustments, Excessive Length of Final Approach. When required, excessive length of final adjustments shall be applied to all approaches, including those not meeting straight-in alignment criteria. Do not adjust the ROC of the circling approach maneuvering area as defined in Chapter 2, Section 6, for excessive length of final.

A3.1.32.1. Determine the length of the straight-in/circling final approach segment by measuring the distance from the plotted position of the FAF to the FEP (see AFMAN 11-226(I), paragraph 252 for FEP definition).

A3.1.32.2. Use the ROC calculated by the criteria in paragraph **A3.1.22.** to determine the CMDA. The published CMDA shall be the higher of:

A3.1.32.2.1. The elevation specified by this paragraph.

A3.1.32.2.2. The elevation determined by application of AFMAN 11-226(I), paragraph 260.

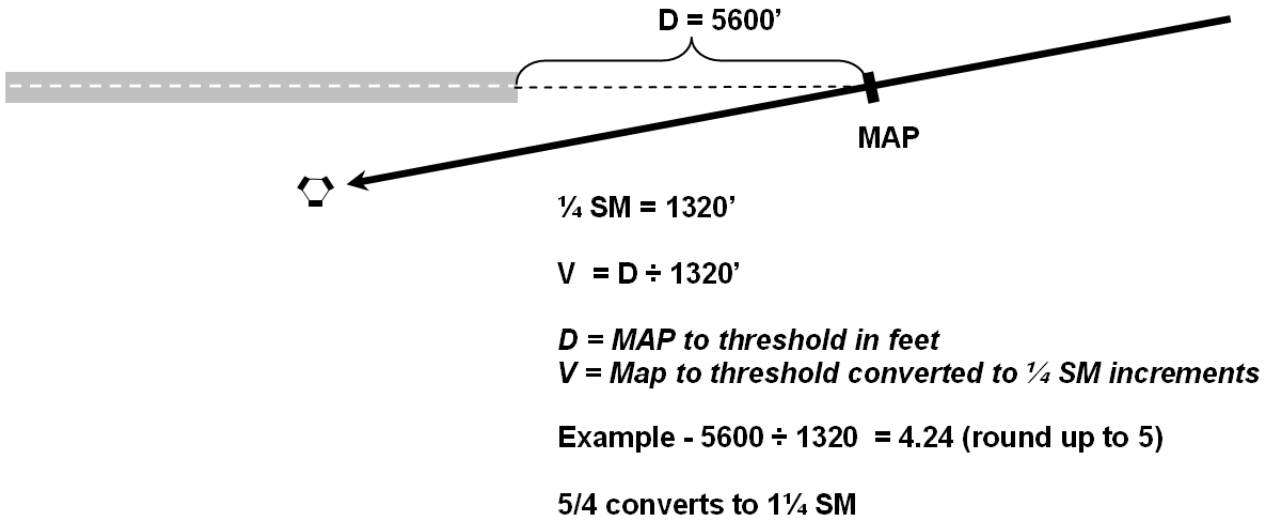
A3.1.32.2.3. The elevation derived from AFMAN 11-226(I), paragraph 351, Table 11.

A3.1.33. Paragraph 325; Decision Height (DH). In addition to the requirements of Chapter 3, make sure each procedure specifies the HAT and/or height above airport (HAA). For foreign procedures, the minima must be the higher of the minima established by the host nation or required by AFMAN 11-226(I) or AATCP-1(B).

A3.1.34. Paragraph 330; Establishment of Visibility Minimums.

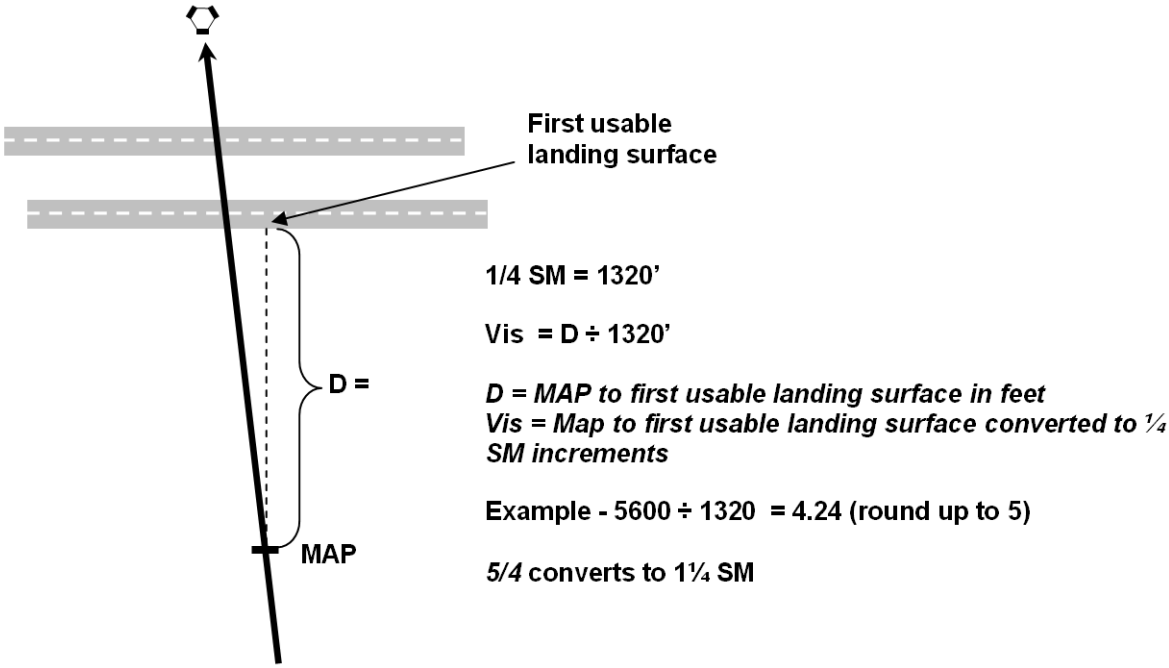
A3.1.34.1. Paragraph 330c(1), determining the effect of MAP-to-threshold distance on straight-in procedures (Figure A3.1.2). Convert the MAP-to-threshold distance (measured in feet) to the higher 1/4 ***STATUTE MILE*** increment when determining the minimum visibility, prior to applying approach light credit. Use the greater of this distance or the values from Table 6A.

Figure A3.1. Determining MAP-to-Threshold Distance (Straight-in).



A3.1.34.2. Paragraph 330c(1), determining the effect of MAP-to-threshold distance on circling-only procedures (**Figure A3.2.**). Convert the distance from the MAP to the first usable landing surface (measured in feet) to the higher 1/4 ***STATUTE MILE*** increment when determining the minimum visibility, prior to applying approach light credit. Use the greater of this distance or the values from Table 6A.

Figure A3.2. Determining MAP-to-Threshold Distances (Circling).



A3.1.34.3. Paragraph 330c(2). The annotation "Fly Visual to Airport" shall be placed in the profile view when the MAP is 2 SM or greater from the threshold for straight-in procedures or when the MAP is 2 SM or greater from the closest landing surface for circling-only approaches.

A3.1.35. Paragraph 331; Effect of HAT/HAA and Facility Distance on Straight-in and Circling Visibility Minimums.

A3.1.35.1. When determining the effect of facility distance to MAP or threshold on straight-in procedures, measure the distance in ***NAUTICAL MILES*** from the facility providing final approach course guidance direct to the MAP or to the FEP. Use the greater of these distances when applying Table 6A.

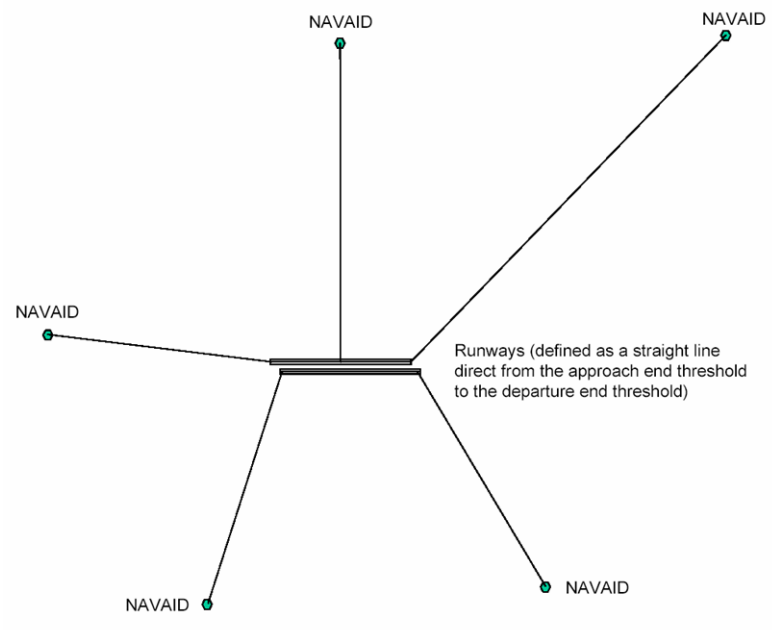
A3.1.35.2. When determining the effect of facility distance to MAP or threshold (whichever is farther) on circling-only procedures, measure the distance in ***NAUTICAL MILES*** from the facility providing final approach course guidance direct to the MAP or direct to the closest runway (**Figure A3.3.**). Use the greater of these distances when applying Table 6A.

A3.1.36. Paragraph 334c; Runway Requirements for Approval of RVR. Use RVR minima equivalent to the no-light minima when runway markings are removed, deteriorated, or obscured and touchdown zone, and centerline lights are inoperative. See paragraph **A3.1.38.**.

A3.1.37. Paragraph 341; Standard Lighting Systems. For SALS or SALSF systems, use SSALS Table 8 entries.

NOTE: SALSF systems are non-standard for the USAF, therefore the sequenced flashers are not considered usable.

Figure A3.3. Determining the Effect of Facility Distance on Visibility Minimums (Circling).



A3.1.38. Paragraph 342a; Operational Conditions, Markings. Runway markings should be in good condition when the procedures are established and minimums are prescribed IAW AFMAN 11-226(I), Volume 1, Chapter 3 criteria. However, the condition of the runway markings will vary during periods when they are partially obscured by surface water, snow, ice or tire marks and it may be difficult to assess their value under these conditions. Airfield Management will coordinate with the OG/CC, or formally designated representative, as outlined in MAJCOM Supplement to AFI 11-230, to determine when these conditions are no longer adequate for taking credit for lights and will provide the results to the TERPS Specialist.

A3.1.39. Paragraph 343e; Visibility Reduction. Do not use see and avoid procedures for obstacles when developing Air Force instrument procedures.

A3.1.40. Paragraph 350; Standard Straight-in Minimums. Table 10. Unless one of the footnotes is applicable, a standard length approach light system is required to utilize the visibility/RVR listed for a specific HAT and aircraft category. Standard approach light lengths are detailed in AFMAN 11-226(I), Volume 1, Appendix 5. When the system is non-standard (to include length and/or configuration), and local authorities (NGA for FTIP locations) have not identified an equivalent system, apply the "NO LIGHTS" visibility from the table when a footnote is not specified.

A3.1.41. Paragraphs 413a(2), 513a(2)(b), 613a(2), and 713a(2)(b). Circling approach alignment criteria, using on-airport facilities, permits the use of all radials (360 degrees). It is not a requirement for the final approach course to pass through a portion of the landing surface. This criterion is applicable to On-Airport VOR (NO FAF); TACAN; VOR/DME; VOR with FAF; NDB ON-AIRPORT (NO FAF); and NDB with FAF circling procedures.

A3.1.42. Paragraph 523b; Final Approach Segment, Arc Final Approach. Application of this paragraph is not authorized.

A3.1.43. Paragraph 613c(1) and 713c(1); Final Approach Segment, Obstacle Clearance, Straight-in. NDB procedures that use the reduced ROC (military exception) shall have following note published in the planview: "NOT FOR CIVIL USE". NDB procedures developed using the higher (civil) ROC do not require this caveat unless driven by a different requirement.

A3.1.44. Appendix 5, paragraph 1; Approach Lighting Systems. The sequenced flashers are not a part of the approach lighting system when applying credit for lights to instrument procedures. If the sequenced flashers are inoperative, the visibility minima for a procedure are not affected. However, if the Runway Alignment Indicator Lights (RAIL) are part of the approach lighting system (MALSR and SSALR), and the RAIL portion of the system becomes inoperative, revert to no-light visibility minimum.

A3.2. AFMAN 11-226(I), Volume 3.

A3.2.1. Paragraphs 1.2.14., 1.2.15, 2.11, Obstacle Free Zones (OFZ). FAA Advisory Circular AC 150 5300-13 is not applicable to military airports; therefore USAF locations do not have runway, inner approach, or inner transitional OFZs. Do not restrict approach minimums based on any OFZ penetration.

A3.2.2. Paragraph 2.3; En Route, Initial, and Intermediate Segments. Solid-state ILS localizers have false courses approximately 35 degrees either side of the final approach course. To assist pilots in avoiding these courses, establish a lead point (fix, lead radial, or bearing) that provides at least 2 miles

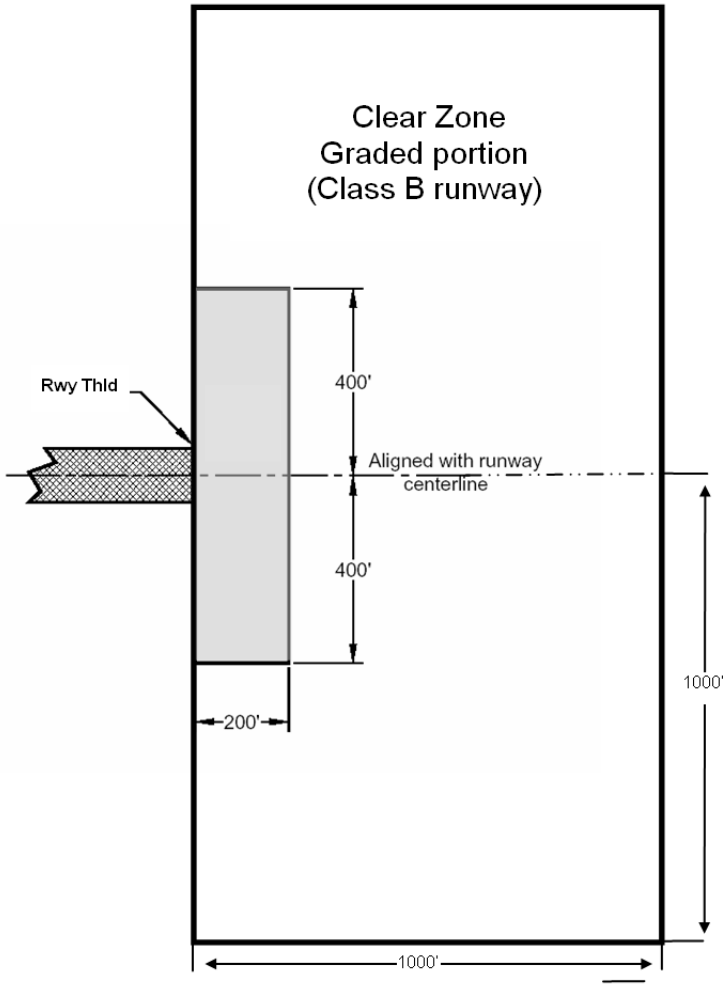
of lead when any part of the initial approach course lies outside of plus or minus 10 degrees of the final approach course.

A3.2.3. Paragraph 2.6.1; Category I Threshold Crossing Height (TCH) Requirements and Table 2-3. When the TCH is commissioned or determined by BFSL at a height which results in a WCH of less than 20 feet or greater than 50 feet for the types of aircraft expected to use the runway, publish an Advisory Note in the IFR Supplement that details the deviations to the Height Group wheel crossing height restrictions and process the procedure as a standard procedure (see **Figure 5.1.**, Processing Standard Instrument Procedures). Sample note: "CAUTION: Height Group 4 WCH 15 ft."

A3.2.4. Paragraph 2.9.1; Distance Measuring Equipment (DME). A DME fix used in lieu of an Outer Marker may be exempted from the six-degree angular divergence criteria only upon completion of a successful flight inspection to verify the suitability of the fix. This exemption is limited to 23 degrees (AFMAN 11-226(I), Volume 1, paragraph 282).

A3.2.5. Paragraphs 3.3 and 4.2, Precision Object Free Areas (POFA). Even though the 'POFA' is not applicable to military airfields, the area associated with a POFA (800' wide centered on runway centerline, extending 200' past threshold) must be evaluated for TERPS purposes. The shaded area (see **Figure A3.4.**) is encompassed by the graded portion of the clear zone (defined in Unified Facilities Criteria (UFC) 3-260-01, Airfield and Heliport Planning and Design). For unrestricted instrument procedures, no above ground objects, regardless of frangibility, are permitted in the shaded area except for taxiing/holding aircraft and those required for air navigation or aircraft ground maneuvering purposes. Parked aircraft (i.e., parking ramps, arm/de-arm areas, hot brake areas, etc.) and/or those deviations permitted by UFC-3-260-01, Attachment 14, that cannot be classified as "necessary for air navigation/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 above ground obstacles/objects, the minimum HAT/visibility for CAT I precision approaches is 250' and ¾ statute mile.

Figure A3.4. Portion of Clear Zone Affecting CAT I Minimums.



A3.3. Category II/III ILS Precision Minimums Requirements.

A3.3.1. Ground Equipment. As required by applicable military directives

A3.3.2. Lighting Facilities. As required by applicable military directives.

A3.3.3. Marking And Signs. As required by applicable military directives.

A3.3.4. Approach Minimums. CAT II/III procedures require special authorization from the FAA or applicable military authority. **Table A3.1.** lists lowest authorized minimums, but individual operators may require higher minimums. Higher minimums may also be necessary based on environmental factors in the vicinity of the airport or other Flight Standards or military requirements. Class II/T/2 facility class of performance is required for CAT II operations. The lowest CAT II height above threshold (HAT)/RVR values in feet are 100/1,200. **Table A3.1.** lists RVR values for HAT values greater than 100.

Table A3.1. Lowest CAT II Minimums.

HAT (feet)	RVR (feet)
101-140 (1-40 adjustment)	1200*
141-180 (41-80 adjustment)	1600
181-199 (81-99 adjustment)	1800

NOTE: Chart the lowest authorized CAT II RVR
*As low as 1000 by Ops Spec

A3.3.4.1. Adjustment of CAT II Minimums. The HAT is measured in feet from the highest elevation of the runway in the touchdown area, and runway visual range (RVR) in feet. The lowest attainable values are a HAT of 100 feet and RVR of 1,200 feet. Application of CAT II obstruction clearance criteria may identify objects that exceed the allowable height in the touchdown area or penetrate the approach light surface. In such cases, adjustment to the decision height shall be made as follows:

A3.3.4.1.1. Final Approach Surface. Requires a special study of local features and conditions before CAT II operations can be authorized.

A3.3.4.1.2. Approach Light Surface and Touchdown Area. Adjust the decision height (DH) upward one-foot for each foot an object exceeds the allowable height. The RVR value will then be adjusted as indicated in **Table A3.1.**

A3.3.4.1.3. Minimum HAT Value. The minimum HAT value for CAT II operations is 100 feet where the runway centerline to taxiway centerline separation is 600 feet or greater. This value may be also be achieved with:

A3.3.4.1.3.1. Runway taxiway centerline separation of 500 feet at elevations of 4,000 feet and below, provided taxi operations are restricted to aircraft with wingspans less than 214 feet and tail heights less than 66 feet.

A3.3.4.1.3.2. Runway taxiway centerline separation of 400 feet at elevations of 4,000 feet and below, provided taxi operations are restricted to aircraft with wingspans less than 171 feet and tail heights less than 55 feet.

A3.3.4.1.3.3. Larger aircraft flying the approach or taxiing on parallel taxiways, or taxiway/runway separation less than stated above require a collision risk analysis to determine the minimum HAT value.

A3.3.4.2. CAT II/III Minimums restrictions. Publish the lowest authorized CAT III RVR when the runway supports unrestricted CAT I and II operations. When CAT I or II operations for a runway are restricted, CAT III minimums for the runway must be determined by a collision risk analysis. The following is the minimum class of performance (AC 120-29, appendix 2) required for an ILS to support a published FAR Part 97 CAT II or III, Standard Instrument Approach Procedure (SIAP):

A3.3.4.2.1. Class III/D/3. Required for Cat III operations with visibility ≥? RVR 600.

NOTE: CAT III procedures with facility class III-D3 performance require the notation "Localizer not suitable for Electronic Rollout Guidance."

A3.3.4.2.2. Class III/E/3. Required for CAT III operations with visibility ≥ ?RVR 600.

A3.3.4.2.3. Class III/E/4. Required for CAT III operations with visibility < RVR 600.

A3.3.5. Final Approach Segment. Develop the final approach segment under TERPS Volume 3, Chapter 3 criteria, with the following exceptions:

A3.3.5.1. Final Approach Course Alignment. The final course alignment must be coincident with the runway centerline.

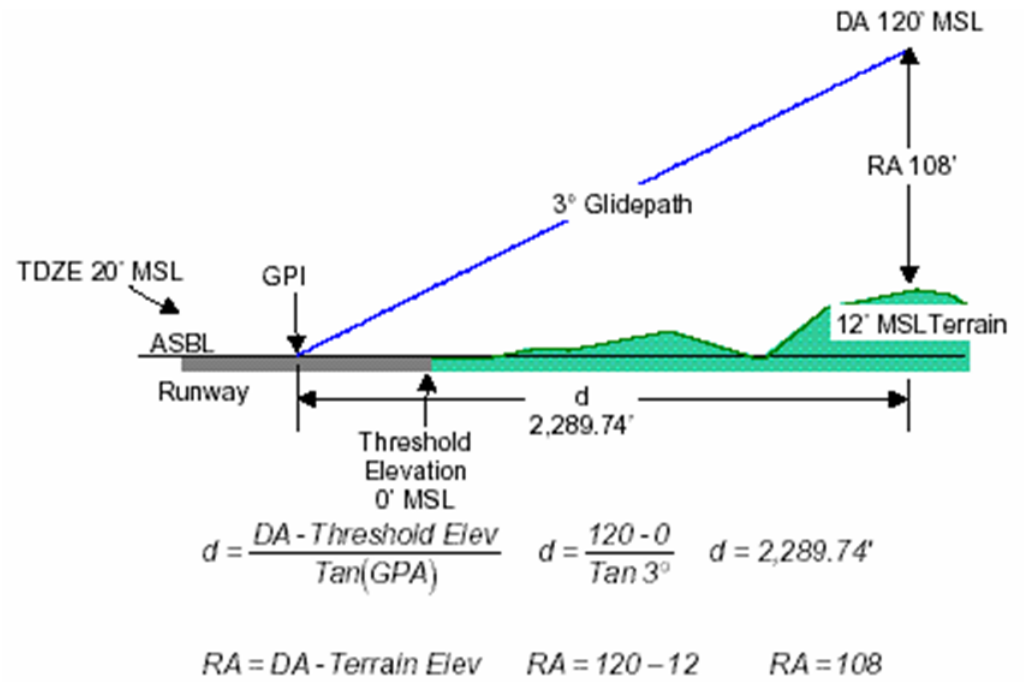
A3.3.5.2. Final Segment Obstacle Clearance Surface (OCS) Penetrations. Penetrations of the primary (W, X) surfaces are not authorized. Taxiing aircraft are obstructions in the final segment analysis. If the "W" or "X" surface is penetrated by a taxiing aircraft (tail height), request a collision risk analysis and approval from the Flight Procedure Standards Branch, AFS-420, P.O. Box 25082, Oklahoma City, Oklahoma, 73125.

A3.3.5.3. Obstruction Assessment. Evaluate the final segment under Chapter 3 of AFMAN 11-226(I) TERPS Volume 3. If DH adjustments are required for obstruction penetrations in the "Y" surface, adjust the HAT upward one foot for each foot the penetration exceeds the allowable height.

A3.3.5.4. Approach Light Area. FAA Airports Division or USAF Civil Engineering is responsible for maintaining obstruction requirements in AC 150/5300-13, Airport Design and applicable military directives. Obstructions shall not penetrate the approach light area.

A3.3.6. Calculation of Radio Altimeter (RA) Height. To determine the RA height, determine the distance (d) from ground point of intercept (GPI) to the point Decision Altitude (DA) occurs. Obtain the terrain elevation 'd' feet from GPI on runway centerline extended. Subtract the terrain elevation from the DA to calculate the DA (see **Figure A3.5.**).

Figure A3.5. Calculating RA.



A3.3.7. Missed Approach Obstruction Evaluation For Cat II And III. Section 1 of the missed approach segment is significantly different from the CAT I precision standard. The CAT II/III Section 1 begins at the end of the final OCS trapezoid, is aligned with the final approach course, and continues in the direction of landing for a distance of 1.5 NM. It is comprised of 3 subsections: Section 1A, Section 1B, and Section 1C. The section 1 OCS's should not be penetrated except by NAVAID's and ancillary facilities fixed by functional purpose.

A3.3.7.1. Acceptable obstructions are as follows:

A3.3.7.1.1. All Visual Aids on Frangible Mounts. For approach lighting system components including visual glide slope indicators (VGSI's), the maximum height is as specified by the latest edition of Order 6850.2 or applicable military directive. For taxiway signs, the latest edition of AC 150/5340-18 or applicable military directive specifies the maximum height.

A3.3.7.1.2. ILS glide slope antenna or monitor masts and automated surface observing system (ASOS) wind sensor towers, which are permitted to exceed 15 feet above the elevation of the points on the runway centerline abeam them.

A3.3.7.1.3. Glide slope shelter, precision approach radar (PAR), RVR, and ASOS components, which shall not exceed a height of 15 feet above the elevation of the point on the runway centerline abeam them (except ASOS wind sensor towers, which may exceed 15 feet). These structures are recommended to be located at least 400 feet from runway centerline; the minimum distance is specified in AC 6750-16, , except where an RVR component must be sited less than 400 feet from runway centerline. Obstructions more than 15 feet above the runway centerline elevation may be permitted if the minimum distance from the runway centerline is increased 10 feet for each foot the structure exceeds 15 feet. Frangible PAR reflectors are not considered obstructions.

A3.3.7.1.4. Aircraft taxiing via a parallel or adjacent taxiway and clear of the obstacle free zone (OFZ) or runway primary surface/clear zone (see AC 150/5300-13 or UFC-3-260-01) may penetrate the CAT II/III missed approach surfaces provided the runway centerline to taxiway centerline distances and aircraft dimensions standards contained in paragraph **A3.3.4.1.3.** are met. Perform a collision risk analysis where the airport elevation is greater than 4,000 feet MSL, where aircraft with wingspans or tail heights are greater than in the specified paragraphs, or for taxi on existing or proposed taxiways that are less than the specified distances from runway centerline. Supporting data required for completing the ICAO Collision Risk Model (CRM) analysis is contained in FAA Order 8260.4, ILS Obstacle Risk Analysis. The data includes airport elevation, largest aircraft type, estimated number of this type of aircraft that could typically be occupying the parallel taxiway during CAT II or III operations, and all obstructions relevant to a CRM analysis in the vicinity of the airport. When taxiing operation as described above during CAT II/III operations are required, the procedure becomes non-standard and requires AF Flight Standards approval. Required operational conditions and/or limitations will be specified in the approval documentation.

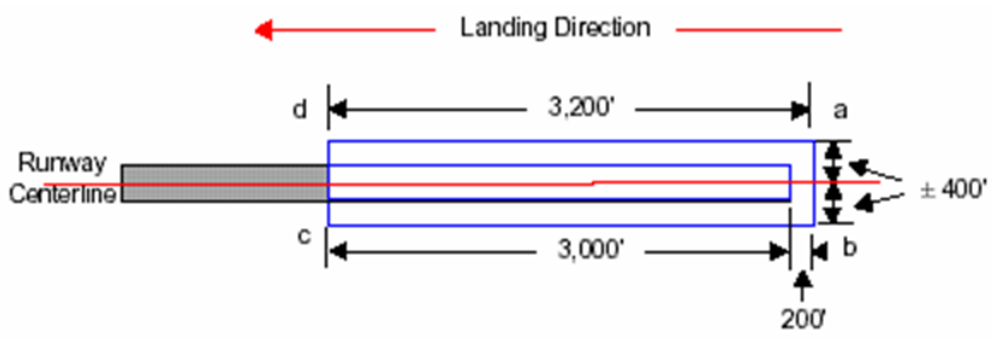
A3.3.7.2. Section 1A. Section 1A is the touchdown area. See **Figure A3.6.**.

A3.3.7.2.1. Area.

A3.3.7.2.1.1. Length. Section 1A begins at the end of the final "W" OCS area (ab line). It extends a distance of 3,200 feet in the direction of landing to a point 3,000 feet from runway threshold (RWT) (cd line).

A3.3.7.2.1.2. Width. Total width of the area is 800 feet (+/- ?400’ from centerline).

Figure A3.6. Section 1A Touchdown Area.



A3.3.7.2.2. OCS. The surface elevation within this area is equal to the elevation of a point on the runway centerline perpendicular to the obstruction being evaluated. The only obstructions permitted in the touchdown area are those obstructions that are fixed by their functional purpose or those required for the approaches. Parked aircraft are not permitted within this area. This area must be free of obstruction penetrations, except for frangible visual NAVAID’s that are required for CAT II and III operations. All obstructions, except visual aids and frangible functional objects, must be marked and lighted in accordance with AC 150/5340-18, Stan-

dards for Airport Sign Systems, or applicable military directives unless shielded by a properly lighted and marked object.

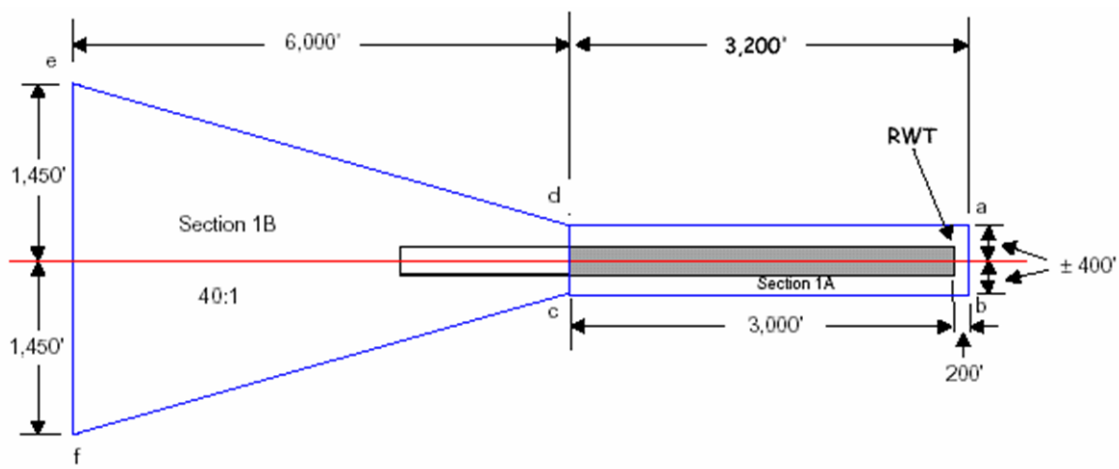
A3.3.7.3. Section 1B. Section 1B begins along a line defining the end of section 1A (cd line) (see **Figure A3.7.**).

A3.3.7.3.1. Area.

A3.3.7.3.1.1. Length. The area extends 6,000 feet from the cd line along the runway centerline.

A3.3.7.3.1.2. Width. The area expands from +/-?400 feet at the cd line to +/-1,450 feet at the end of the section (ef line).

Figure A3.7. Section 1B.



A3.3.7.3.1.3. OCS. Section 1B is a 40:1 surface that begins at the elevation of the runway centerline 3,000 feet from the RWT, and rises to a height of 150 feet above ASBL. Evaluate obstructions using the shortest distance from the obstruction to the beginning of section 1B (cd line). This surface must be free of penetrations to approve CAT II or III operations.

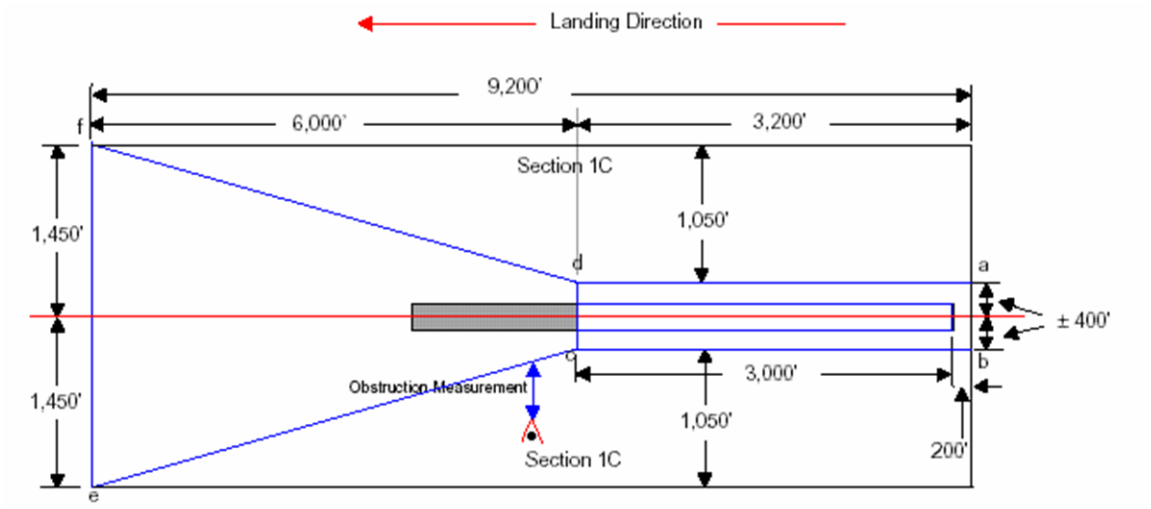
A3.3.7.4. Section 1C. Touchdown Area Transitional Surfaces (see **Figure A3.8.**).

A3.3.7.4.1. Area. Section 1C consists of two parts, one on each side of the runway adjacent to sections 1A and 1B. The areas begin at the beginning of section 1A (ab line) and extend in the direction of landing.

A3.3.7.4.2. Length. The length of Section 1C is approximately 1.5 NM (9,200 feet).

A3.3.7.4.3. Width. The width of the section is 1,050 feet from its beginning (ab line) to a point abeam the cd line. This width tapers from 1,050 feet abeam the cd line,to zero at the end of section 1B (ef line).

Figure A3.8. Section 1C.



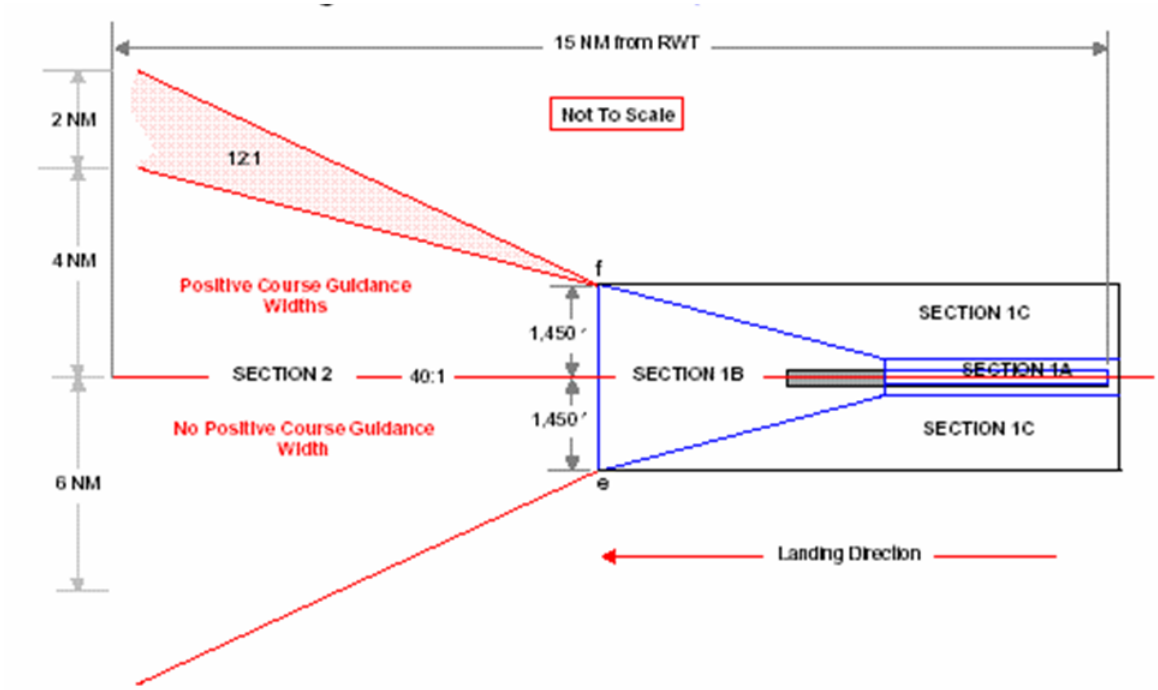
A3.3.7.4.4. OCS. Section 1C is a 7:1 surface that rises perpendicular to the missed approach course from the elevation and boundary edge of section 1A or B to a height of approximately 150 feet above the ASBL. Evaluate obstructions measuring perpendicular to the missed approach course, from the outer edge of section 1A or 1B to the obstruction. The OCS should not be penetrated. A structure, such as a building or tower, which penetrates section 1C is an obstruction to CAT II/III landing operations even when the same obstruction does not penetrate the imaginary surfaces. When fixed obstructions penetrate the OCS, the procedure becomes non-standard. When deemed necessary and approved by AF Flight Standards, adjust RVR minimums commensurate with the degree of interference presented by the obstruction. Publish the RVR required in application of **Table A3.1.** as if the HAT were adjusted for the penetration. Do not adjust the HAT. Add a cautionary note to the approach procedure to identify the obstruction. Parked aircraft that penetrate section 1C are considered an obstruction to CAT II/III landing operations.

A3.3.7.5. Section 2. See **Figure A3.9.**.

A3.3.7.5.1. Area.

A3.3.7.5.1.1. Straight-ahead Missed Approach Area. This portion of the area starts at the end of section 1 and is centered on a continuation of the section 1 course. The width increases uniformly from 3,100 feet at the beginning to 12 miles at a point 15 miles from the runway threshold. When positive course guidance is provided for the missed approach procedure, secondary reduction areas which are zero miles wide at the point of beginning and increase uniformly to 2 miles wide at the end of Section 2, must be added to Section 2 (see **Figure A3.9.**).

Figure A3.9. Section 2, Non-RNAV.



A3.3.7.5.1.2. Turning Missed Approach Area. (Applies to turns of over 15°). See **Figure A3.10.** and **Figure A3.11.**. The design of the turning missed approach area assumes that aircraft missing an approach will climb straight ahead until reaching a height of at least 300 feet above the elevation of the runway centerline at the end of the touchdown area. The procedure will identify the obstruction if a turn toward a significant obstruction has to be made. The turning flight track radius shall be 1.75 miles and it shall be plotted to begin at the end of Section 1. The outer boundary of section 2 shall be drawn with a 3.5 mile radius. The inner boundary line shall commence at the outer edge of the Section 1C surface opposite the end of the touchdown area. The outer and inner boundary lines shall terminate at points 4 miles each side of the assumed flight track 15 miles from the runway threshold. Where secondary areas are required, they shall commence after completion of the turn. Turns in the missed approach area are normally specified to commence after reaching a height of 300 feet. Where an operational requirement exists to continue the climb of the aircraft to a height of more than 300 feet prior to commencing a turn, Section 1 will continue to increase uniformly in width, and will be extended longitudinally 4,000 feet for each 100 feet of height over 300 feet. In addition, Section 1C is also extended laterally on the inside of the turn to a height equal to the elevation attained by the extension of Section 1.

A3.3.7.5.1.3. Obstructions in the Missed Approach Area. The 40:1 missed approach surface identifies obstructions which may be a hazard in the missed approach area. When an object penetrates the 40:1 surface, the missed approach procedure will contain a note specifying the minimum rate of climb required to clear the obstruction by the number of feet determined by the following formula: Clearance=0.31579 x (obstruction height above DER). The climb gradient is effective until reaching a hundred-foot (3,100; 1,600; etc.)

altitude from which the 40:1 surface is clear. Do not publish climb gradients less than 152 feet/NM.

Figure A3.10. Turning Missed Approach Detail.

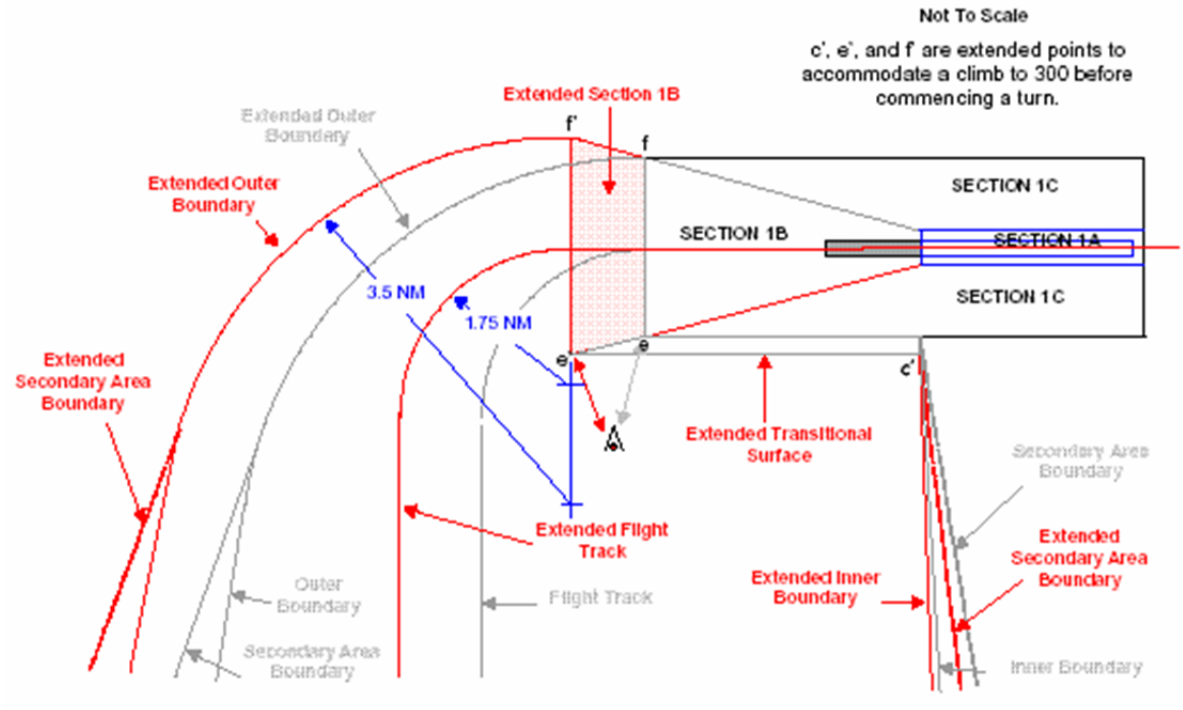
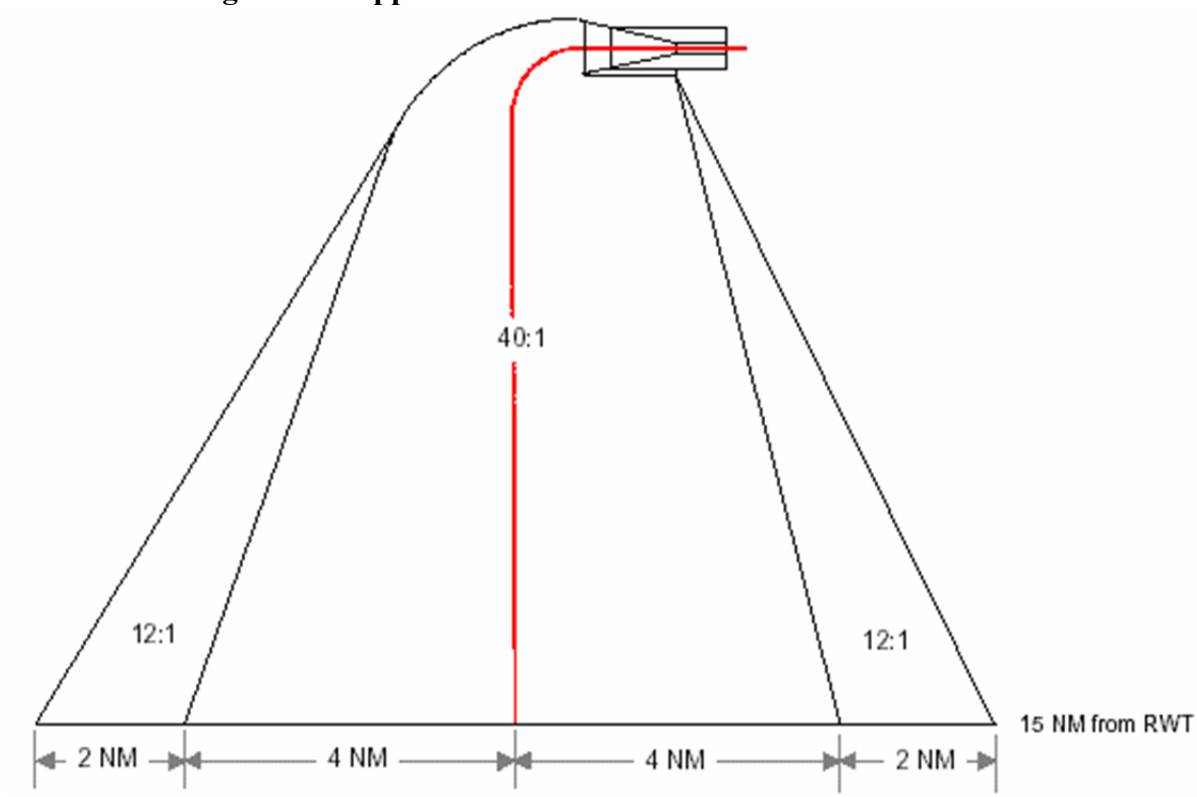


Figure A3.11. Turning Missed Approach Detail - continued.



A3.4. AFMAN 11-226 (I), Volume 1, paragraph 142, Changes. DELETED.

A3.5. AFMAN 11-226 (I), Volume 1, paragraph 150d, Coordinating Airspace Action. DELETED.

A3.6. AFMAN 11-226 (I), Volume 1, paragraph 161, Straight-In Procedure Identification. DELETED.

A3.7. AFMAN 11-226 (I), Volume 1, paragraph 163, Differentiation. DELETED.

A3.8. AFMAN 11-226 (I), Volume 1, paragraph 211, Positive Course Guidance. DELETED.

A3.9. AFMAN 11-226 (I), Volume 1, paragraph 221, Minimum Safe Altitudes. DELETED.

A3.10. AFMAN 11-226 (I), Volume 1, paragraph 221b, Emergency Safe Altitudes. DELETED.

A3.11. AFMAN 11-226 (I), Volume 1, paragraph 232a[2] and Table 1, Initial Approach Segments Based on Straight Course and Arcs With Positive Course Guidance. DELETED.

A3.12. AFMAN 11-226 (I), Volume 1, paragraph 235, Initial Approach Based On High Altitude Teardrop. DELETED.

A3.13. AFMAN 11-226 (I), Volume 1, paragraph 252, Descent Angle/Gradient. DELETED.

A3.14. AFMAN 11-226 (I), Volume 1, paragraph 253, Visual Descent Point. DELETED.

A3.15. AFJMAN 11-226, Volume 1, paragraph 261, Circling Approach Area Not Considered for Obstacle Clearance. DELETED.

A3.16. AFMAN 11-226 (I), Volume 1, paragraph 270, Missed Approach Segment. DELETED.

A3.17. AFMAN 11-226 (I), Volume 1, paragraph 272, Missed Approach Point. DELETED.

A3.18. AFMAN 11-226 (I), Volume 1, paragraph 274, Straight Missed Approach Obstacle Clearance. DELETED.

A3.19. AFMAN 11-226 (I), Volume 1, paragraph 282, DME Fixes. DELETED.

A3.20. AFMAN 11-226 (I), Volume 1, paragraph 310, Takeoff and Landing Minimums. DELETED.

A3.21. AFMAN 11-226 (I), Volume 1, paragraph 320, Height Above Touchdown, HAT. DELETED.

A3.22. AFMAN 11-226 (I), Volume 1, paragraph 323c, Minimums Adjustments. DELETED.

A3.23. AFMAN 11-226 (I), Volume 1, paragraph 330c(2), Establishment of Visibility Minimums. DELETED.

A3.24. AFMAN 11-226 (I), Volume 1, paragraph 334c, Runway Requirement for Approval of RVR. DELETED.

A3.25. AFMAN 11-226 (I), Volume 1, paragraph 342a, Runway Marking Obscuration. DELETED.

A3.26. AFMAN 11-226 (I), Volume 1, paragraph 343e, Visibility Reduction. DELETED.

A3.27. AFMAN 11-226 (I), Volume 1, paragraphs 513a[1][a] and 713a[1][a]. DELETED.

A3.28. AFMAN 11-226 (I), Volume 1, paragraph 523b, Final Approach Segment. DELETED.

A3.29. AFMAN 11-226 (I), Volume 1, paragraph 613c(1) and 713c(1), Obstacle Clearance. DELETED.

A3.30. AFMAN 11-226 (I), Volume 1, paragraph 952, Alignment. DELETED.

A3.31. AFMAN 11-226, Volume 1, paragraph 1750c(2), LF Airways and Routes. DELETED.

A3.32. AFMAN 11-226, Volume 1, paragraph 1750 d.(2)(a), LF Airways and Routes. DELETED.

A3.33. AFMAN 11-226 (I), Volume 1, Appendix 5, paragraph 1, Approach Lighting Systems. DELETED.

A3.34. AFMAN 11-226 (I), Volume 3, paragraph 2.3, En Route, Initial, Intermediate Segments. DELETED.

A3.35. AFMAN 11-226 (I), Volume 3, paragraph 2.9.1, Distance Measuring Equipment (DME). DELETED.

Attachment 4

TERMINAL INSTRUMENT PROCEDURES GUIDE

NOTE: This attachment provides terminal instrument procedures (TERPS) specialists with AFMAN 11-226 (I) quick reference calculations/formulas and guidance for using maps and charts in developing instrument procedures.

A4.1. GPI, RPI, TCH Computations.

A4.1.1. Calculate GPI, RPI, and TCH for ILS procedures as detailed in **Figure A4.1.** through **Figure A4.3.** Factors that influence these computations include the glidepath angle (GPA), runway threshold elevation, glideslope antenna elevation, glideslope antenna to threshold distance, and runway crown elevation abeam glideslope antenna. The formulas vary based on whether the runway "slope" or gradient is positive or negative. Slope is negative if the threshold elevation is higher than that of the "RPI" and positive if the threshold elevation is lower. Always use Rapidly Dropping Terrain calculations. These calculations may also be used for MMLS procedures. Replace ILS glideslope antenna to threshold distance with MMLS elevation antenna to threshold distance. Also add the height of center of the elevation antenna phase array (normally 5 ft) to the elevation antenna site elevation and use in the place of the ILS glideslope antenna elevation.

Figure A4.1. RPI/GPI/TCH Computations for Runways with Zero Slope.

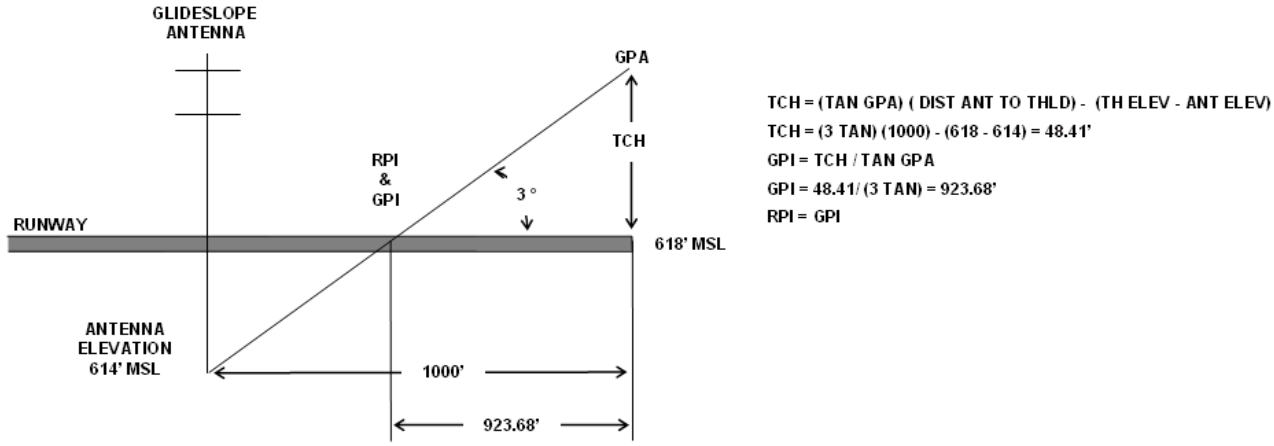


Figure A4.2. RPI/GPI/TCH Computations for Positive Sloping Runways.

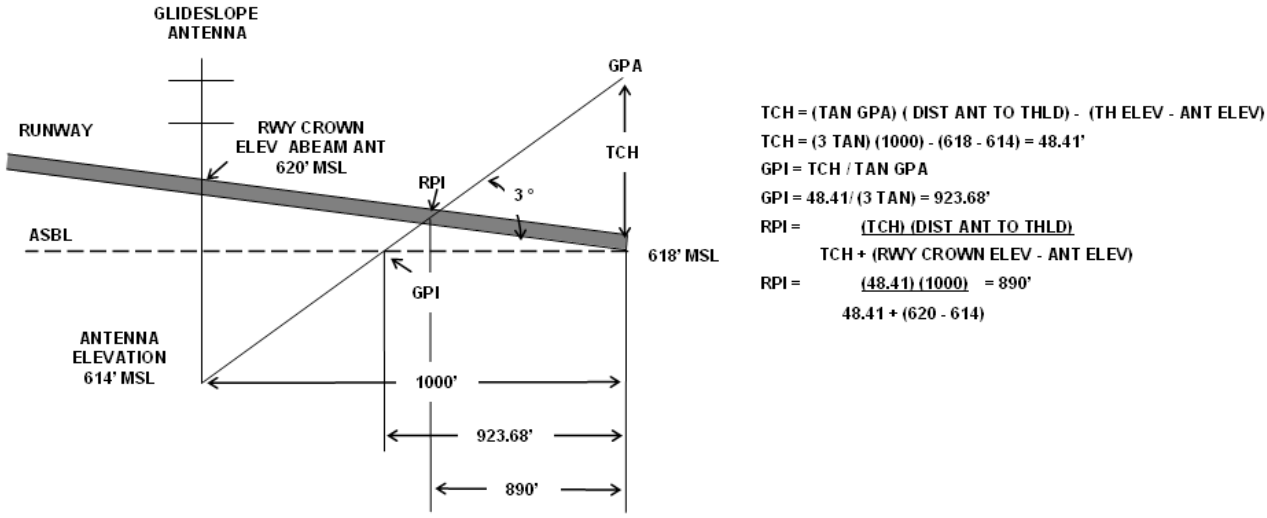
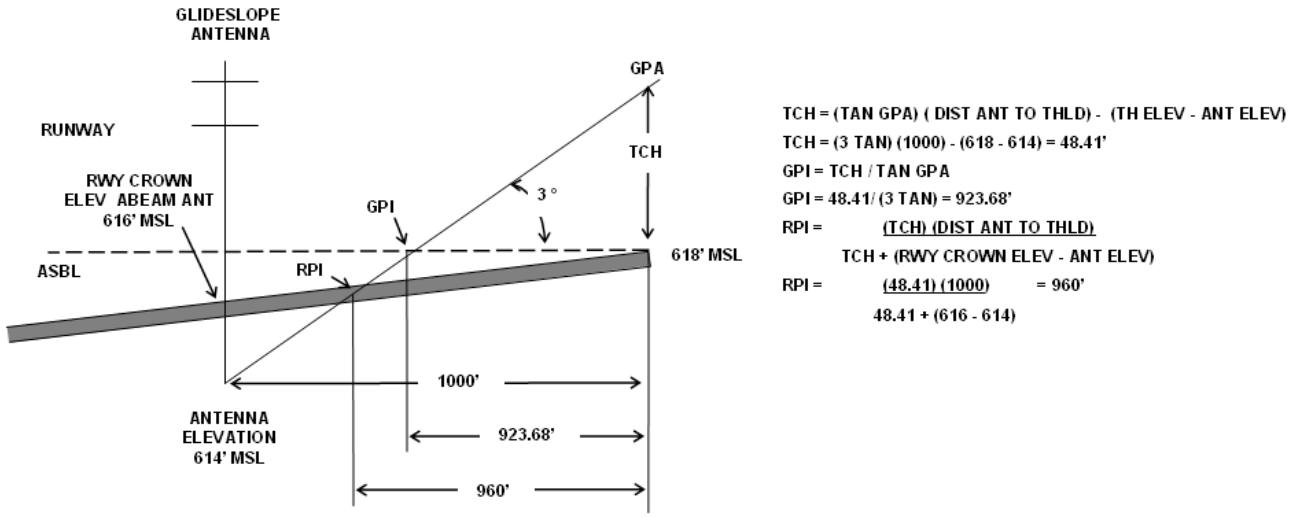


Figure A4.3. RPI/GPI/TCH Computations for Negative Sloping Runways.

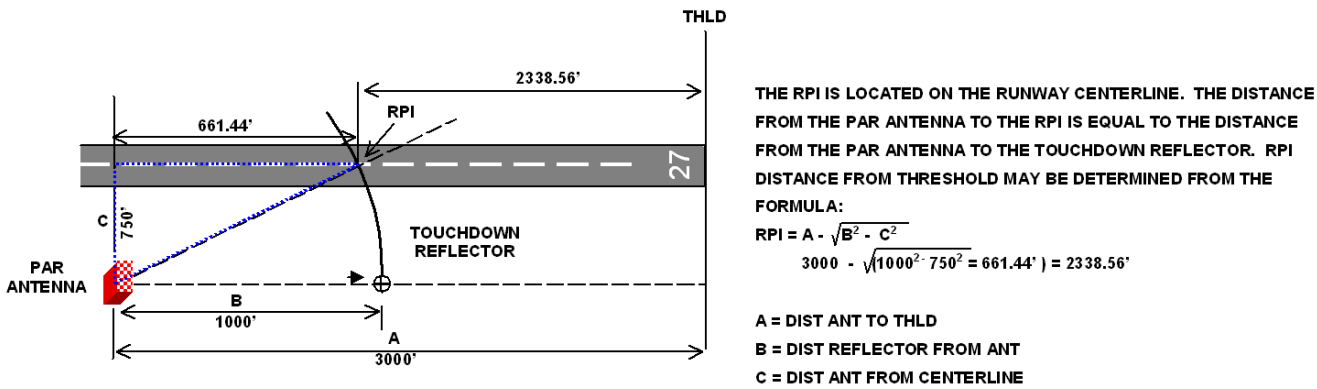


A4.1.2. For GPN 22/25, TPN-19 PAR systems, RPI computations are not necessary. The RPI is determined during system installation, and may be confirmed by the checking the "Touchdown (Kft)" value on the site parameter panel.

NOTE: This value is from RPI to the point abeam the PAR antenna. In order to use this RPI value (i.e. for coincidence issues, or FAA Form 8240-22 Facility Data Sheet input) the number must be converted to distance from threshold.

A4.1.3. For FPN-16/62, MPN-14K PAR systems, the RPI (touchdown) will be located at a point where an arc swung from the PAR antenna to the touchdown reflector crosses the runway centerline (see **Figure A4.4.**):

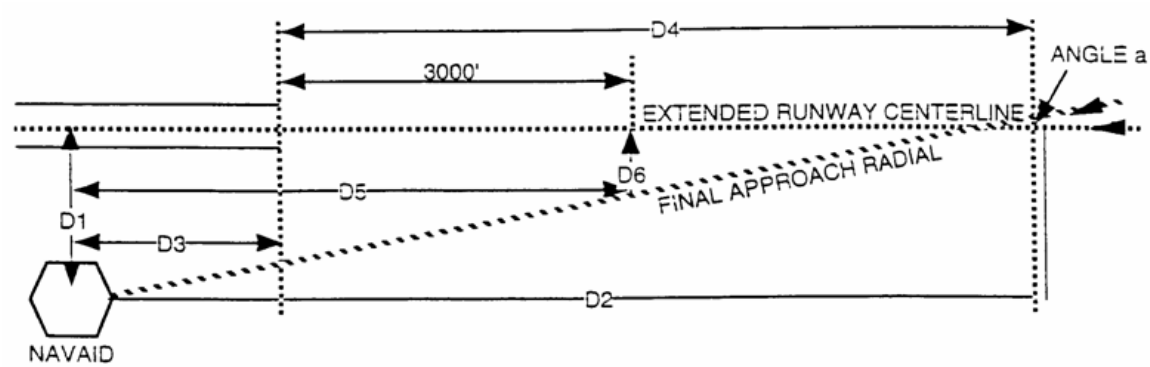
Figure A4.4. PAR RPI Distance from Runway Threshold.



A4.1.4. TCH (also referred to as Reference Datum Height (RDH)) is the height of the glideslope directly above the runway threshold. Normally, this value is computed mathematically (see **Figure A4.1.** through **Figure A4.3.**). At some locations, FAA flight inspection personnel apply FAAO 8240.47, ***Determination of Instrument Landing System (ILS) Glidepath Angle, Reference Datum Heights (RDH), and Ground Point of Intercept***. Using the "Best Fit Straight Line (BFSL)" method, flight inspection will determine a RDH based on ILS equipment performance recorded during the flight check. When this method is applied, the flight inspection report will indicate the RDH in the remarks section.

A4.2. Selection of TACAN and VOR Final Approach Radials for on-Airport Facilities. 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. If an operational advantage can be attained when the final approach course does not intersect the centerline, 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, the following systems can be used 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.

Figure A4.5. Selecting Final Approach Radial (NAVAID past Threshold).



Symbology terminology:

Angle a = The difference between the runway heading and final approach course stated in degrees.

T = Tangent of angle a.

D-1 = Lateral distance from a point on the runway centerline or extended centerline, stated in feet, obtained from survey results or engineering maps.

D-2 = Distance in feet from a point on the runway centerline opposite the facility to the crossover point, derived from calculations explained below.

D-3 = Distance from a point on the runway centerline opposite the facility to runway threshold. This is a negative value if the facility is located behind the threshold (**Figure A4.5.**) or a positive value if the facility is located in front of the runway threshold (**Figure A4.6.**). Obtain this measurement from actual survey or engineering map.

D-5 = The distance from the facility to a point 3,000 feet from the runway 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.

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.

Finding approach radial/runway centerline crossover point. The approach facility behind the runway threshold (**Figure A4.5.**):

Step 1. Determine the distance between the facility and the runway center-line (D-1).

Step 2. Obtain the distance between the facility and the runway threshold (D-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).

Step 4. Convert angle a to a tangent.

Step 5. Divide distance D-1 by the tangent.

Finding lateral displacement of approach radial/runway centerline 3,000 feet from runway threshold:

Step 1. Divide distance D-1 by the tangent of the angle a.

Step 2. Add distance D-3 to 3,000 feet to get distance D-5.

Step 3. Subtract distance D-5 from distance D-2.

Step 4. Multiply the result of Step 3 by the tangent of angle a. If the answer to Step 4 (distance D-6) is 500 feet or less, it meets lateral displacement criteria. If it exceeds 500 feet, consider selecting another radial or request a waiver.

Selecting final approach radials. By using the following method, a final approach radial can be selected that meets the lateral displacement criteria:

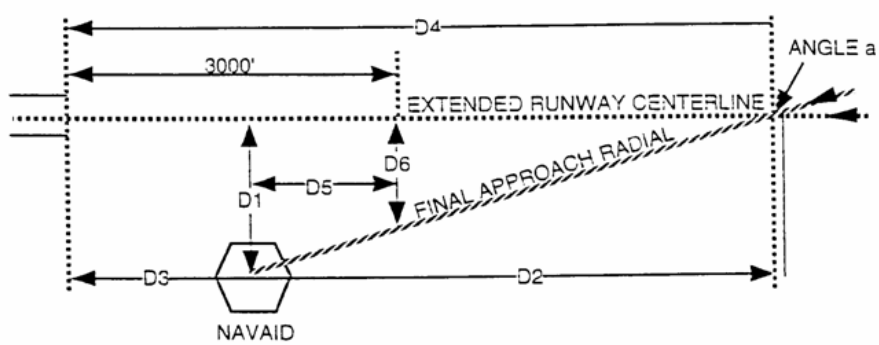
Step 1. Subtract 500 feet from distance D-1 (**Figure A4.5.**).

Step 2. Divide the answer in Step 1 by distance D-5 to obtain the tangent of angle a.

Step 3. Convert the tangent of angle a to degrees. Round up to the next hundredth (.01) of a degree.

Step 4. If 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. If 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 remainder of the 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).



A4.3. Determining DME Arc intercept angles. Precision criteria specifies 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 AFMAN 11-226, Volume 3, Chapter 2, General Criteria, to determine this angle.

A4.4. Determining Points on Maps and Charts. Since maps do not always accurately depict the Airfield Reference Point (ARP), NAVAIDs, fixes, or the locations of some man-made obstacles, the TERPS specialist must have the ability to manually plot geodetic (Lat/Lon) 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.

Figure A4.7. Locating Lat/Lon Grid Rectangle that contains target coordinates.

A4.4.1. Plotting Known Geographical Coordinates. *NOTE*: Instead of Degrees/Minutes/Seconds, coordinates are sometimes recorded as Degrees/ Decimal minutes. See paragraph **A4.7.** for conversion calculations.

Example: Plot the ARP coordinates at Myrtle Beach International airport (N 33° 40' 47.10" W 078° 55' 42.00")

Step 1. Locate the Lat/Lon grid rectangle that contains the coordinates to be plotted. **Figure A4.8.** 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).

Step 2. Using an engineers scale, determine the number of seconds per “tick” of latitude and longitude on the scale map being used.

Example:

Latitude: 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 ruler. Our example uses N 33° 30’ 00" and N 33° 45' 00"

The difference between N 33° 30’ 00" and N 33° 45' 00" is 15’. Convert 15’ to seconds by multiplying by 60. (15’ x 60= 900”)

The measured distance between N 33° 30’ 00" and N 33° 45' 00” is 261 “ticks”.

261 “ticks” divided by 900” = 0.29 seconds per “tick”.

Longitude: 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 engineers ruler. Our example uses N 78° 45’ 00" and N 79° 00’ 00".

The difference between N 78° 45’ 00" and N 79° 00’ 00" is 15’. Convert 15’ to seconds by multiplying by 60. (15’ x 60= 900”)

The measured distance between N 78° 45’ 00" and N 79° 00’ 00"" is 191 “ticks”.

191 “ticks” divided by 900 = 0.21222 seconds per “tick”.

Step 3. See **Figure A4.9.** 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. ***NOTE***: It is generally easier to select the working latitude that is less than the target latitude, but either way is acceptable

Example 1: Working latitude selected is N 33° 40' 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.

33° 40' 47.10"
- 33° 40' 00.00”
47.10”

Example 2: Working latitude selected in N 33° 41’ 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.

33° 41' 00.00"
- 33° 40' 47.10”
12.9”

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.

Example 1: 47.10 x 0.29 = 13.659 or 14 “ticks” north of N 33° 40' 00”.

Example 2: 12.9 x 0.29 = 3.741 or 4 “ticks” south of N 33° 41' 00”

Step 5. See **Figure A4.9.** Add or subtract the working longitude value from the target longitude as appropriate in the same manner for longitude in Step 3. ***NOTE***: It is generally easier to select a working longitude that is less than the target longitude, but either way is acceptable.

Example 1: Working longitude selected is W 78° 55' 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”

Example 2: Working longitude selected in W 78° 56’ 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”
18.0”

Step 6. Determine the number of engineer scale “ticks” for the sum determined in step 5.

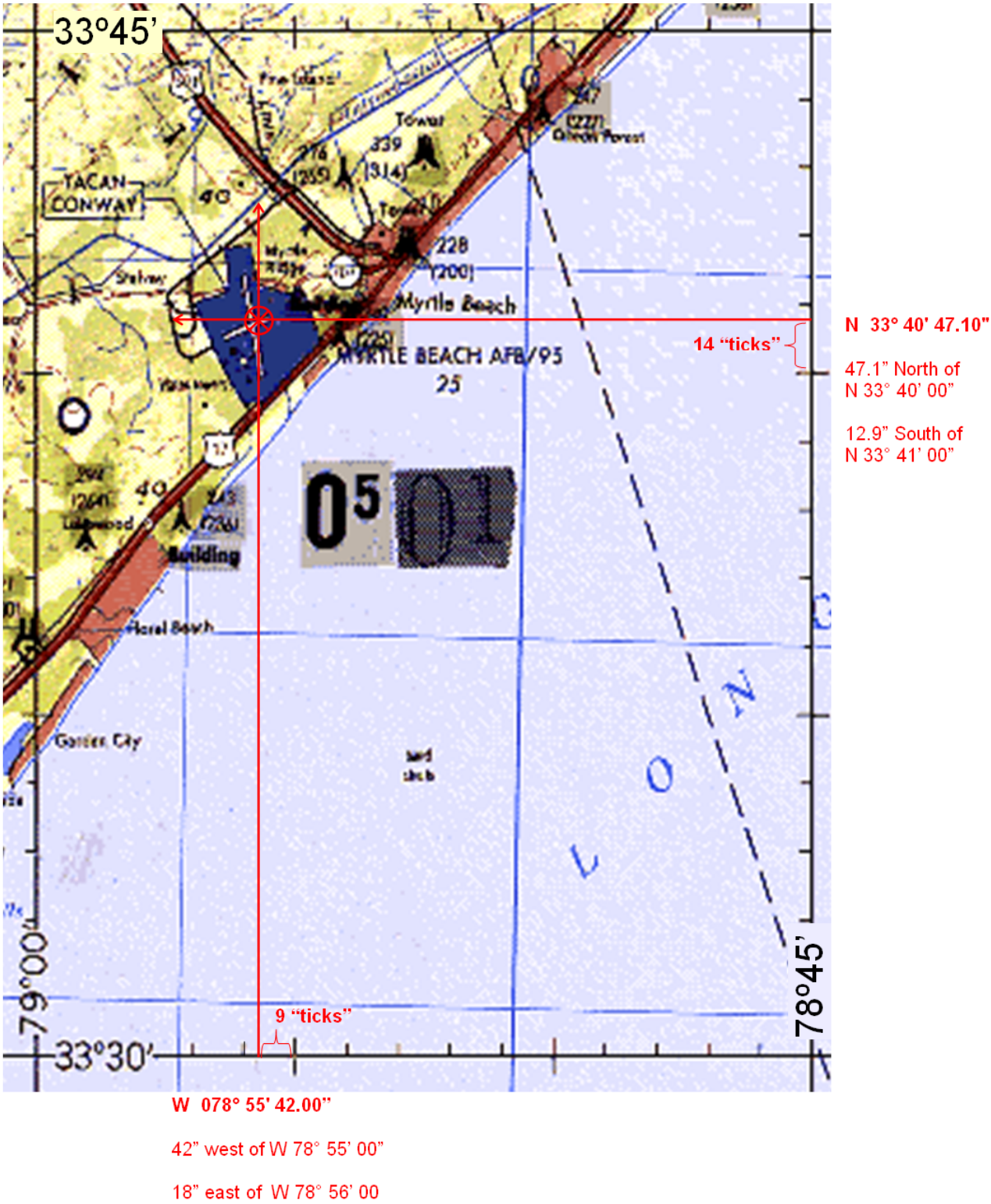
Example 1: 42 x 0.2122 = 8.9124 or 9 “ticks” west of N 78° 55' 00”

Example 2: 18 x 0.2122 = 3.8196 or 4 “ticks” east of N 78° 56' 00”

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).

A4.4.2. Determining Unknown Geographical Coordinates. The process for determining a set of coordinates for an object/point depicted on a map is the reverse of those steps for plotting known coordinates. First take steps 1 and 2 as outlined in paragraph **A4.4.1.** 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/longitude by finding the nearest hashmark from the points where the working lines intersect the latitude/longitude grid. Using an engineer’s ruler, measure the number of “ticks” between the working lines and the working latitude/longitudes. ***Divide*** the number of “ticks” by the seconds per “tick” values to determine the number of seconds the point is from the working latitude/longitude. Add or subtract as necessary the seconds from the working coordinates to determine the latitude/longitude.

Figure A4.8. **Measuring Distance from Working Latitude/Longitude to Target Latitude/Longitude.**



A4.5. True Bearing Conversions.

TRUE BEARINGS shown on some engineering maps are depicted as values between 000 and 090, by quadrant. These bearings must be converted to TRUE AZIMUTH (relative to true north) for TERPS application. Using the illustration (**Figure A4.10.**), convert TRUE BEARING to TRUE AZIMUTH as follows:

Example: True Bearing N45E

1. N and E identify the quadrant
2. 000 plus 045 = 045° true azimuth

Example: True Bearing S45E

1. S and E identify the quadrant
2. 180 minus 045 = 135° true azimuth

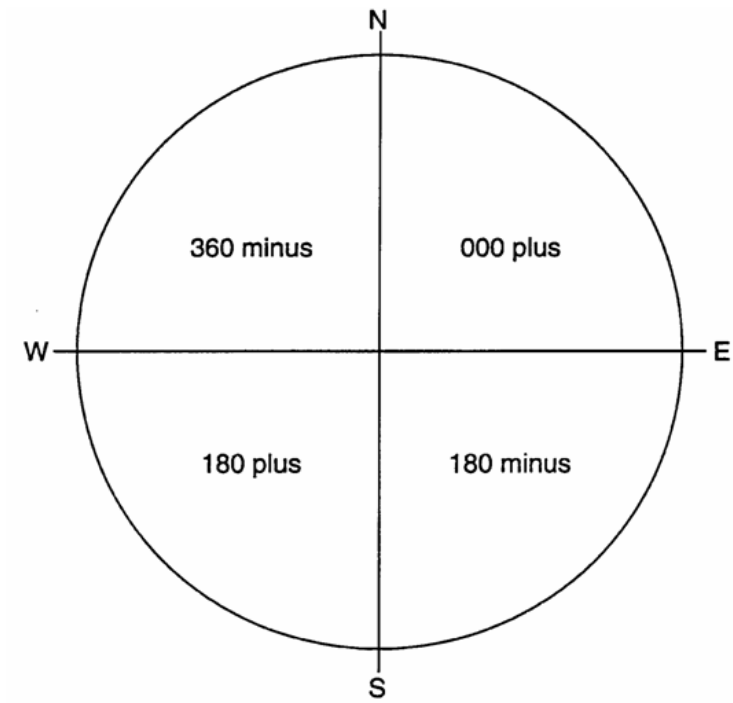
Example: True Bearing S45W

1. S and W identify the quadrant
2. 180 plus 045 = 225° true azimuth

Example: True bearing N45W

1. N and W identify the quadrant
2. 360 minus 045 = 315° true azimuth

Figure A4.9. True Bearing Conversions



A4.6. 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 is commonly referred to as 'slave' variation. Variation applied to an airfield is commonly referred to as 'area' variation.

A4.6.1. 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 degrees, subtract 360 degrees to convert the result to a positive value between 0 and 360 degrees.

Table A4.1. East Variation.

When Converting:	Apply the following:
True to Magnetic with East Variation	**TRUE - VARIATION = MAGNETIC** Example: 11° East Variation 355° True – 11° = 344° Magnetic
Magnetic to True with East Variation	**MAGNETIC + VARIATION = TRUE** Example: 11° East Variation 355° True + 011° = 006° True (366° - 360° = 006°)

A4.6.2. 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 degrees, subtract 360 degrees to convert the result to a positive value between 0 and 360 degrees.

Table A4.2. West Variation.

When Converting:	Apply the following:
True to Magnetic with West Variation	**TRUE - VARIATION = MAGNETIC** Example: 11° West Variation 355° True + 11° = 006° Magnetic (366° - 360° = 006°)
Magnetic to True with West Variation	**MAGNETIC + VARIATION = TRUE** Example: 11° West Variation 355° True – 011° = 344° True

A4.7. Miscellaneous Formulas:

1 NM = 6076.11548 feet 1 SM = 5280 feet 1" Latitude = 101.268594 feet (average)

1 NM = 1.852 Kilometers 1 Km = 3280.8399 feet 1 meter = 39.3700787 inches/3.2808399 feet

To Convert	To	Function	By Value
Meters	Feet	multiply	3.2808399
		divide	0.3047999
Feet	Meters	multiply	0.3047999
		divide	3.2808399
Meters	Yards	multiply	1.093613298
		divide	0.91439998
Yards	Meters	multiply	0.91439998
		divide	1.093613298
Kilometers	Statute Miles (SM)	multiply	0.621371193
		divide	1.609343997
Statute Miles (SM)	Kilometers	multiply	1.609343997
		divide	0.621371193
Kilometers	Nautical Miles (NM)	multiply	0.539956804
		divide	1.851999995
Nautical Miles (NM)	Kilometers	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

FAF to MAP Calculations - $\frac{\text{Dist(nm)}}{\text{Speed in knots}} \times 60$ = Time in decimal minutes (i.e. 3.5 = 3 minutes, 30 seconds)

Rate of Descent FPM = Ground Speed Knots x $\frac{\text{(G/S angle)}}{(57.29577951)}$ x 101.2685914

Coordinates in Degree/Decimal minutes to Degree/Minutes/Seconds:

Decimal portion of Minutes x 60 = Seconds

Example: N 32º 25.69'

.69 x 60 = 41.4"

N 32º 25.69 = N 32º 25' 41.40"

Coordinates in Degree/Minutes/Seconds to Degree/Decimal Minutes:

(Seconds ÷ 60 = Decimal) + minutes

Example: N 78º 13' 43.20"

(43.20 ÷ 60 =. 72) + 13 = 13.72'

N 78º 13' 43.20" = N 78º 13.72'

To find the length or angle of an arc (**Figure A4.11.**):

$$\text{Length} = \frac{\text{angle x radius}}{57.29577951}$$

$$\text{Angle} = \frac{57.29577951 \text{ x length}}{\text{radius}}$$

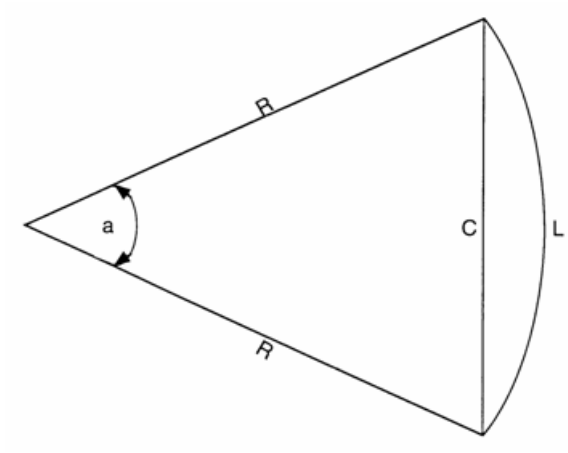
The following formula may be used when it becomes necessary to calculate the straight-line distance between two points on an arc:

$$\text{Chord(C)} = 2\ R \sin \frac{(a)}{2}$$

Angle(a) = Number of degrees between Radials

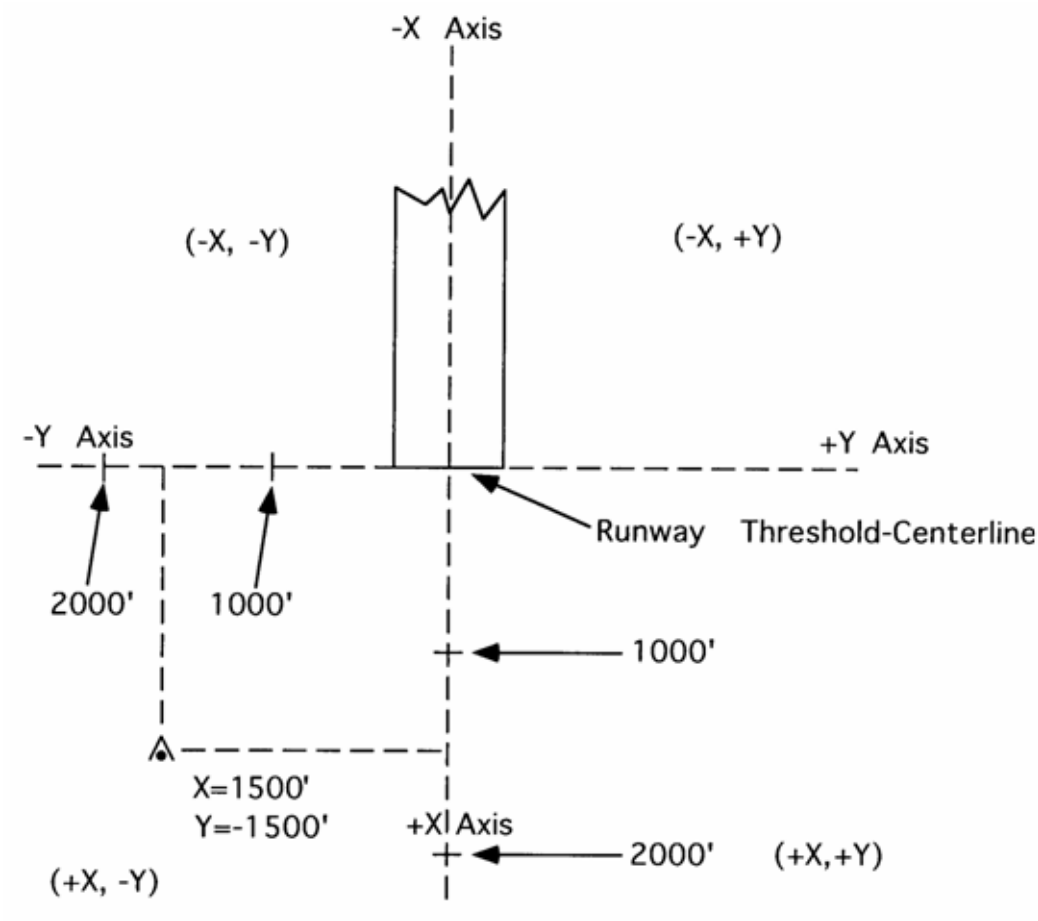
Radius R = Distance (DME) of arc

Figure A4.10. Straight-Line Distance Between Two Points of an Arc.



A4.8. Cartesian Coordinates (X-Y axes). The position of an obstacle or facility can be located by determining its location 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 A4.12.**).

Figure A4.11. Cartesian Coordinates.



A4.9. Calculating length of Teardrop Initial segment. Use **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.

$$\frac{206 \times 4.499}{57.29577951} = 16.175 \text{ NM}$$

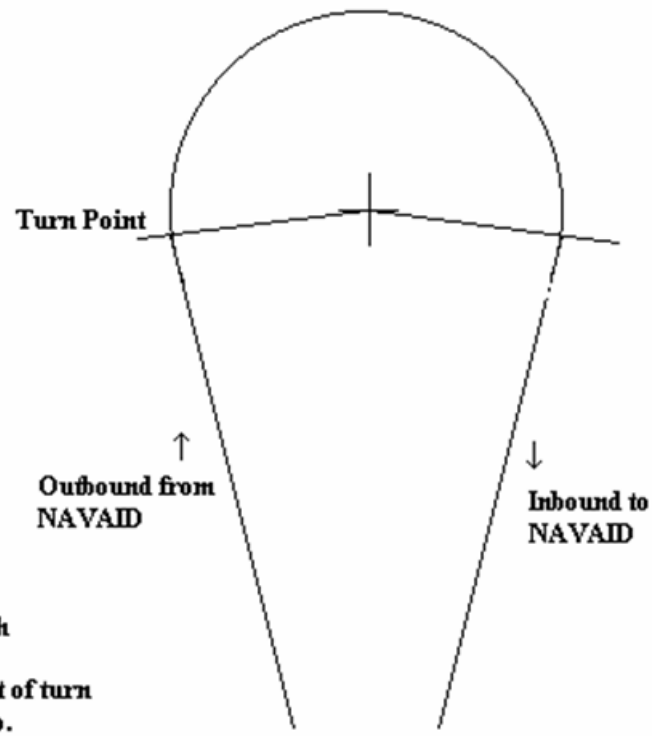


Table A4.3. RNAV Coordinate Conversion Table

SECONDS TO TENTHS OF MINUTES

SECONDS		TENTH OF MINUTE	SECONDS		TENTH OF MINUTE	SECONDS		TENTH OF 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

SECONDS AND TENTHS OF SECONDS TO HUNDRETHS OF MINUTES

Sec/10th		Min/100th	Sec/10th		Min/100th	Sec/10th		Min/100th	Sec/10th		Min/100th
00.0-00.2	=	0.00	14.7-15.2	=	0.25	29.7-30.2	=	0.50	44.7-45.2	=	0.75
00.3-00.8	=	0.01	15.3-15.8	=	0.26	30.3-30.8	=	0.51	45.3-45.8	=	0.76
00.9-01.4	=	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

A4.10. Calculating Missed Approach Climb Gradients. The following guidance applies when there is a penetration of the missed approach obstacle clearance surfaces and other options (DA/MDA adjustment) is not feasible (nonstandard procedure);

A4.10.1. Within the CONUS, Alaska, and Hawaii , use the following formula for precision missed approach;

$$h = Oe - (DA - [\tan(gpa) \times 1460])$$

$$CG = \frac{h}{0.76 \times d}$$

Where Oe = Obs. MSL elev + vert. accuracy (*for obstacles in secondary area use equivalent height)

d = Shortest distance (NM) from end of section 1A to obstructio n

GPA = glide path angle

Example :

$$332 = \frac{1549 - (300 - [\tan(3.00) \times 1460])}{0.76 \times 5.26}$$

Where Oe = 1549 feet MSL

DA = 300 feet MSL

GPA = 3.00°

d = 5.26 NM

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.

Example: ROC = 0.24(CG x d) 419.11 = 0.24(332x5.26) 420+1549=1969 (round up to next 100 ft. increment).

Publish the following note "CAUTION: Missed Approach Climb Rate to 2000" above the minimum climb table.

NOTE: 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.

A4.10.2. Within the CONUS, Alaska, and Hawaii , use the following formula for non-precision missed approach;

$$h = Oe - (MDA - [ROC + Adj])$$

$$CG = \frac{h}{0.76 \times d}$$

Where Oe = Obs.MSL elev + vert. accuracy (*for obstacles in secondary area use equivalent height)

d = Shortest distance (NM) from start of missed approach area

Example :

$$344.95 = \frac{1549 - (420 - 250)}{0.76 \times 5.26NM}$$

Where Oe = 1549 feet MSL

MDA = 420 feet MSL

d = 5.26 NM

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.

Example: ROC = 0.24(CG x d) 435.52 = 0.24(345x5.26) 436+1549=1985 (round up to next 100-foot increment). Publish the following note "CAUTION: Missed Approach Climb Rate to 2000" above the minimum climb table.

NOTE: 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.

A4.10.3. Calculating Missed Approach Climb Gradients OCONUS where AFMAN 11-226(I) criteria is applied (excludes host nation or locations where the USAF exercises TERPS authority where ICAO/NATO criteria is applied). Also applicable CONUS if operationally required (procedure annotated 'NOT FOR CIVIL USE').

A4.10.3.1. Precision. (Applicable only to Section 2. For Section 1 penetrations, only DA adjustments are authorized).

A4.10.3.1.1. Apply the applicable Section 2 missed approach criteria from Volume 3, Chapter 3 to determine the amount of penetration of the MA surface, in feet.

A4.10.3.1.2. Divide the amount of penetration by the NM distance 'D' from the OCS calculations (shortest distance from the obstacle to the 'a-b' line at the end of Section 1). The resultant value is equal to the difference between the standard OCS and the OCS required to clear the penetrating obstacle.

A4.10.3.1.3. Add 200 to the result of **A4.10.3.1.2.** and round up to the next 10-foot increment. The resultant value equals the minimum publishable CG to clear the obstruction with the required ROC.

A4.10.3.1.4. Calculate the 'climb-to' altitude by multiplying the published CG from paragraph **A4.10.3.1.3.** by the NM distance 'D' determined in **A4.10.3.1.2.**. Round the results to the higher 100-foot value and publish the rounded value as the missed approach climb gradient.

A4.10.3.2. Non-precision.

A4.10.3.2.1. Apply the applicable missed approach criteria from Volume 1, Chapter 2 to determine the amount of penetration of the MA surface, in feet.

A4.10.3.2.2. 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.

A4.10.3.2.3. Add 200 to the result of **A4.10.3.2.2.** and round up to the next 10-foot increment. The resultant value equals the minimum publishable CG to clear the obstruction with the required ROC.

A4.10.3.2.4. Calculate the 'climb-to' altitude by multiplying the published CG from paragraph **A4.10.3.2.3.** by the NM distance 'D' determined in **A4.10.3.2.2.**. Round the results to the higher 100-foot value and publish the rounded value as the missed approach climb gradient.

Attachment 5

CHECKLIST FOR REVIEW OF HOST NATION INSTRUMENT PROCEDURE PROGRAMS AND AIRPORTS

NOTE 1: Each checklist item applies to both Airports and Programs except item A5.2.

NOTE 2: Each checklist item applies to both the accredited and the special accredited status except items A5.13 and A5.14.

Accreditation Checklist Items	YES	NO	N/A
A5.1. Do government authorities from an ICAO member nation or a Special Administrative Region (SAR) manage the candidate's program/airport?			
A5.2. Is the candidate program in a country that meets ICAO standards IAW the FAA IASA Program? ***NOTE:*** This item is not applicable (N/A) to individual airports.			
A5.3. When a single host nation AIP covers more than one country, are individual candidate's methods and practices clearly discernible?			
A5.4. When a single AIP covers military and civilian procedures, does the AIP specify methods and practices employed by each?			
A5.5. Is U.S. TERPS, ICAO PANS-OPS, or NATO criteria utilized for the design of instrument procedures, including departure procedures? ***NOTE:*** Each set of criteria/procedures above is accepted; identify which one is used.			
A5.6. Is flight inspection performed to standards outlined in ICAO Annex 10 or FAA Order 8200.1, even when performed by a private company/ government contractor?			
A5.7. Have all host declared exceptions to any of the accepted criteria or ICAO procedures been documented and forwarded to AFFSA/XOIP for review?			
A5.8. Does the MAJCOM TERPS function have an open line of communication with the host nation instrument procedure/aviation data OPR(s) to enhance AIP/individual procedure currency and maintainability?			
A5.9. Does the host nation staff for the program or airport being evaluated develop and send NOTAMs when required to ensure their published instrument procedures remain accurate?			
A5.10. Does the MAJCOM TERPS function receive host nation NOTAMs soon enough to ensure corrective action(s) can be taken on published DoD instrument procedures *before the host change is effective*?			
A5.11. Are host NOTAMs for temporary/permanent instrument procedure changes being incorporated into the US NOTAM system?			

Accreditation Checklist Items	YES	NO	N/A
A5.12. Does host nation source data indicate that the candidate program publishes coordinates in the WGS-84 datum? ***NOTE:*** When 'NO', identify the datum(s) used. When 'YES', document whether the WGS-84 coordinates are derived via survey or via mathematical conversion.			
A5.13. Does the candidate program publish all host nation source documentation (AIP, FLIP data, NOTAMs, etc.) in easily understandable English? ***NOTE:*** This item is not applicable (N/A) to accredited candidates.			
A5.14. Does the candidate program conduct a 'post-production review' of their published instrument procedures? ***NOTE:*** This item is not applicable (N/A) to accredited candidates.			
A5.15. Based on documented MAJCOM experience with this candidate, does the instrument procedure program continually demonstrate the ability to develop and publish instrument procedures that are safe, flyable and meet accepted criteria?			

Attachment 6

CHECKLIST FOR SPECIAL ACCREDITATION OF HOST NATIONS/AIRPORTS. DELETED.

Attachment 7

CHECKLIST FOR REVIEW AND/OR PUBLICATION OF FOREIGN TERMINAL INSTRUMENT PROCEDURES

CHECKLIST ITEM	CONFORMS TO _____ CRITERIA			CHECKLIST ITEM	CONFORMS TO _____ CRITERIA		
MSA	YES	NO	N/A	**MISSED APPROACH SEGMENT**	YES	NO	N/A
NAVAID				COURSE ALIGNMENT			
SOURCE				CLIMB GRADIENT			
				SPECIAL NOTES			
HOLDING PATTERNS	YES	NO	N/A	REVIEW WORDING OF MISSED APPROACH INSTRUCTIONS			
LEG LENGTH							
NO COURSE SIGNAL ZONE							
AIRSPEED REQUIREMENTS				**PLANVIEW**	YES	NO	N/A
				LEGIBILITY			
INITIAL SEGMENT	YES	NO	N/A	RESTRICTIONS			
FIX IDENTIFICATION				SPECIAL NOTES			
ALTITUDES							
TEARDROP ANGLE OF DIVERGENCE				**PROFILE**	YES	NO	N/A
				LEGIBILITY			
ARC LENGTH				RESTRICTIONS			
SEGMENT LENGTH				SPECIAL NOTES			
DESCENT GRADIENT							
LEAD RADIAL							
COURSE ALIGNMENT							
SPECIAL NOTES							
INTERMEDIATE SEGMENT	YES	NO	N/A				
FIX IDENTIFICATION							
ALTITUDES							
SEGMENT LENGTH				**DEPARTURE PROCEDURES**	YES	NO	N/A
DESCENT GRADIENT				Has the host nation established departure procedures for obstacle avoidance?			
LEAD RADIAL							
COURSE ALIGNMENT							
SPECIAL NOTES				DER CROSSING HEIGHT			
				CLOSE-IN OBSTACLE DEPICTION			
FINAL SEGMENT	YES	NO	N/A	EARLY TURNS			
FIX IDENTIFICATION				CLIMB GRADIENTS			
ALTITUDES				CROSSING ALTITUDES			
SEGMENT LENGTH				POSITIVE COURSE GUIDANCE			
DESCENT GRADIENT				SPECIAL NOTES			
COURSE ALIGNMENT				RESTRICTIONS			

CHECKLIST ITEM	CONFORMS TO _____ CRITERIA			CHECKLIST ITEM	CONFORMS TO _____ CRITERIA		
STEP DOWN FIX(ES)				COMPLEXITY (Determine if text, graphic, or both depictions are needed)	Text	Graphic	Both
MAP LOCATION							
THRESHOLD CROSSING HEIGHT							
MINIMUMS				**FLYABILITY CHECK**	YES	NO	N/A
SPECIAL NOTES				Does the TERPS Specialist have any specific areas of concern?			
CIRCLING	YES	NO	N/A				
RESTRICTIONS				**MISCELLANEOUS**	YES	NO	N/A
SPECIAL NOTES				Do the primary areas of any segment overlap any Special Use Airspace?			
Specialist's Printed Name: _____				Specialist's Signature: _____ Date: _____			

Attachment 8

INSTRUMENT PROCEDURE FLYABILITY CHECK INSTRUCTIONS

A8.1. Instrument procedure flyability checks are flown to ensure procedures are safe, practical, and consistent with good operating procedures. Flyability checks are NOT official flight inspections ('flight checks'), but shall include the entire procedure including the missed approach segment and all holding patterns. Flyability Checks are documented on AF IMT 3992, ***Instrument Procedure Flyability Check, Instrument Approach Procedure (IAP)*** or AF IMT 3993, ***Instrument Procedure Flyability Check, Departure Procedure (DP),*** whichever is appropriate. These forms shall be maintained with the TERPS procedure package. See paragraph **7.3.** for additional guidance when conducting flyability checks at host nation locations.

A8.2. All flyability checks should determine whether the procedure is flyable and safe for a minimally qualified, solo pilot flying an aircraft equipped with basic IFR instrumentation under Instrument Meteorological Conditions (IMC) - could a low time lieutenant flying a single seat fighter in bad weather safely fly the approach?

A8.3. Flyability checks will be flown under visual meteorological conditions (VMC). While conducting the flyability check, the crew must be vigilant for obstructions, especially those not depicted that could be hazardous. Final approach course alignment ("desired aiming point") should also be looked at carefully - you should be able to safely maneuver from the missed approach point to touchdown.

A8.4. Consider the following human factors carefully:

A8.4.1. **Complexity.** The procedure should be as simple as possible. It should not impose excessive work load.

A8.4.2. **Interpretability.** The NAVAID which provides information for the final approach course should be clearly identifiable. Be careful, NAVAIDs located on or near the final approach course, but that are not part of the final approach segment, are often subject to misinterpretation. 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.

A8.4.3. **Memory Considerations.** An aeronautical chart is a storehouse of information. A pilot must be able to extract information quickly and accurately, so evaluate whether essential data can be quickly and easily found and deciphered.

A8.5. Flyability check IMTs should be reviewed before the flyability check is flown. Complete the flyability check (see examples at **Figure A8.1.**, **Figure A8.2.** or **Figure A8.3.**) and sign. Any comments should be written in the remarks section. Whenever possible, the pilot should personally debrief the TERPS specialist responsible for the procedure. Remember, recommendations are always welcome.

Figure A8.1. 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 A8.2. 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 Comm (789) 777-6789

AF IMT 3992, 19961201, V2 (REVERSE)

Figure A8.3. 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 Comm (789) 777-6789	123 AW AMC

AF IMT 3993, 19961201, V3

Attachment 9

USE OF INTERNATIONAL CRITERIA

A9.1. Introduction. Outside the contiguous United States, the majority of nations use a variation of International Civil Aviation Organization (ICAO) Document 8168-OPS/611, *Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) Volume II, Construction of Visual and Instrument Flight Procedures*, for the development of instrument approach and departure procedures. As of July 2003, North Atlantic Treaty Organization (NATO), along with Partners for Peace (PfP) nations have adopted ICAO criteria and use NATO Standardization Agreement (STANAG) 3759, *NATO Supplement to ICAO Doc 8168-OPS/611, Volume II, For the Preparation of Instrument Approach and Departure Procedures - AATCP-1(B)*, to address military specific requirements such as TACAN and approach minima. Additionally, STANAG 3759 has been accepted by Air Standardization Coordinating Committee (ASCC) nations (United Kingdom, Canada, New Zealand, Australia and the United States) as Air Standard (AS) 90/07 making the use of AATCP-1(B) more of a global standard. The USAF has ratified STANAG 3759 and AS 90/07, and has identified AFI 11-230 as its implementing document.

NOTE: The use of the term 'PANS-OPS' within this chapter refers only to Volume II of ICAO Doc 8168-OPS/611, fourth edition – 1993, amendments 1-10.

A9.2. Implementation. The USAF will implement ICAO criteria on a staged basis at locations outside the contiguous United States and its territories. 'USAF International TERPS Criteria', as established in this document, will be used in conjunction with PANS-OPS and AATCP-1(B) to establish a single USAF international standard.

NOTE: Although AATCP-1(B) is a NATO document, its use is a conduit to establish an international USAF standard. USAF International TERPS Criteria, which includes the use of a AATCP-1(B), will be used for review of FTIP and in the development of instrument approach and departure procedures at locations where it is deemed necessary by MAJCOMs to apply ICAO standards.

A9.2.1. Criteria. Except as supplemented by this attachment, use PANS-OPS in conjunction with AATCP-1(B) for FTIP reviews, review and publication of host nation FTIP and the design of instrument procedures at locations outside the US where the USAF has responsibility. Unless otherwise specified in this chapter, mixing criteria standards, USAF TERPS and USAF International TERPS, is not authorized.

A9.2.1.1. Deviations to Criteria. When a waiver is required due to criteria deviations, specify in the waiver package the applicable document and paragraph to be waived. For example: PANS-OPS, Volume II, Part III, paragraph 5.6, or AATCP-1(B), paragraph 414.d.1, etc.

A9.2.1.2. When a specific requirement exists for a type of instrument procedure that is not addressed in this attachment, AATCP-1(B) or PANS-OPS, use USAF TERPS standards.

NOTE: Amendments to PANS-OPS and future versions of AATCP-1 will be implemented via AFI 11-230 as automation evolves.

A9.2.2. Training. USAF TERPS specialist shall be formally trained in ICAO standards prior to reviewing or designing instrument procedures IAW USAF International TERPS standards (see **Chapter 12**).

A9.2.3. Application. MAJCOMs will be responsible for determining when they, and their supported units, will implement the USAF International TERPS standard. Application should include all procedures at a single location. Consideration of the following should be taken when determining which USAF standard to apply:

A9.2.3.1. Is the host nation standard ICAO, or some variation consistent with the ICAO philosophy?

A9.2.3.2. Has the USAF TERPS specialist responsible for the location been formally trained in ICAO standards?

A9.2.3.3. Does GPD support the type of procedure(s) to be reviewed/designed?

A9.2.4. Use of Automation. The USAF GPD automation program should be used to the maximum extent possible when reviewing and designing instrument procedures IAW USAF International TERPS Criteria. Select the 'NATO' criteria button when a procedure is to be reviewed or designed IAW USAF International TERPS criteria.

A9.2.4.1. Use of GPD is mandatory for reviewing or designing precision final approach segments IAW USAF International TERPS criteria.

A9.2.4.2. Except for precision final segments, when GPD does not support a particular segment type or procedure to be reviewed/designed manual methods may be applied.

A9.2.4.3. For situations where GPD does not support the type of segment or procedure to be reviewed/designed, and when explicit guidance is not provided in PANS-OPS, MAJCOMs may consider deferring their implementation of the USAF International TERPS standards until GPD supports such requirements.

NOTE 1: GPD incorporates international criteria using standard units (SI) of measurement (meters, kilometers and gradients expressed in percentages) and allows input/output to be expressed in equivalent non-SI units (feet, nautical miles and gradients expressed in feet per nautical mile). This sometimes results in erroneous violations to criteria. When erroneous violations are encountered, such as "Initial descent gradient (1000 ft/nm) is greater than the maximum of 16.4%", document the discrepancy in the 'Justification' dialog box. A waiver is not required when a violation is generated due to the use of non-SI units.

NOTE 2: For those sections within PANS-OPS that are expressed in implicit terms, HQ AFFSA/XOIP has provided the GPD software developer with explicit explanations of criteria in order to achieve a single standard USAF-wide.

A9.2.5. The USAF will implement in the following manner:

A9.2.5.1. Phase I. HQ USAFE will evaluate/re-design the instrument procedures at Ramstein (ETAR) and Spangdahlem (ETAD) Air Bases in Germany.

A9.2.5.2. Phase II. MAJCOMs with FTIP responsibilities will systematically transition to the USAF International TERPS standard.

A9.2.5.3. Phase III. All MAJCOMs with instrument procedure design and review responsibility at locations outside the contiguous United States and its territories (to include USAF bases) where the host nation uses ICAO (or a variation) will transition to the USAF International TERPS standard.

A9.2.6. MAJCOMs shall notify AFFSA/XOIP of their intent to implement each applicable phase listed above.

A9.2.7. During the transition period, MAJCOMs can be selective in their application of USAF International TERPS criteria. Ensure that procedure packages, the **Attachment 7** checklist, and FTIP review letters clearly identify which standard is applied.

A9.3. Use of AATCP-1. Except as stated in this attachment, use AATCP-1(B) in conjunction with PANS-OPS at locations where USAF International TERPS standards apply.

A9.3.1. Chapter 1, *Administrative*. Except for Section 1, use for informational purposes only. Specific USAF administrative guidance is contained in AFMAN 11-226 and in various chapters of AFI 11-230.

A9.3.2. Chapter 2, *Supplemented PANS-OPS Criteria*.

A9.3.2.1. Paragraphs 201 through 213 and paragraph 260 are not applicable. The USAF has yet to establish requirements for helicopter procedures IAW ICAO standards.

A9.3.2.2. Paragraph 238. Not applicable. Also see paragraph **A9.3.5.**. For PAR final and missed approach segments, use USAF TERPS criteria. For the remaining segments associated with PAR procedures, use PANS-OPS and AATCP-1(B).

A9.3.3. Chapter 3, *Additional Military Criteria – General*.

A9.3.3.1. Paragraph 311.a, *Descent Gradient*. USAF GPD calculates descent gradients in percentages, which results in a violation when a descent gradient greater than 996 ft/NM is entered. Disregard the violation if the descent gradient is less than or equal to 1000 ft/NM.

A9.3.3.2. Paragraph 313. Not applicable. Use USAF TERPS criteria for visual portion of final and Visual Descent Point (VDP).

A9.3.4. Chapter 4, *Additional Military Criteria – Takeoff and Landing Minima*.

A9.3.4.1. When a stepdown fix is included in the final segment, minimums with, and without the stepdown fix shall be provided.

A9.3.4.2. Paragraph 418, *Emergency Safe Altitude*. In addition, the ESA center point for an RNAV approach shall be the ARP.

A9.3.5. Chapter 6, *Additional Military Criteria – Precision Approach Radar (PAR)*. Not applicable. For PAR final and missed approach segments, use USAF TERPS criteria. For the remaining segments associated with PAR procedures, use PANS-OPS and AATCP-1(B).

A9.3.6. Chapter 8, *Additional Military Criteria - Helicopters*. Not applicable. The USAF has yet to establish requirements for helicopter procedures IAW ICAO standards.

A9.4. Use of PANS-OPS. Except as stated in this chapter, use AATCP-1(B) in conjunction with PANS-OPS at locations where USAF International TERPS standards apply.

A9.4.1. Part II, *Procedure Construction and Obstacle Clearance Criteria for Departure Procedures*.

A9.4.1.1. Currently, GPD is only capable of evaluating omnidirectional departures, with options to adjust the Procedure Design Gradient (PDG) and turn altitude.

A9.4.1.2. Chapter 2, paragraph 2.4.1, *Obstacle Identification Surface (OIS)*. The origin of the OIS begins at a height equivalent to the DER elevation. The origin height may be raised as high as 16 feet to eliminate penetrations to the OIS. Establishing the origin height at an altitude greater than 16 feet requires a waiver. When the origin height is raised above 0, publish a DER crossing height on the procedure.

A9.4.1.3. Chapter 3, paragraph 3.2.3, *Obstacle Identification Surface*. See paragraph **A9.4.1.2.** above.

A9.4.1.4. Chapter 4, paragraph 4.3.1, *Area 1 OIS*. See paragraph **A9.4.1.2.** above.

A9.4.2. Part III, *Procedure Construction and Obstacle Clearance Criteria for Instrument Approach Procedures*.

A9.4.2.1. Chapter 1, paragraph 1.9.2. When converting IAS to TAS, use the formula specified in Attachment F to Part III, Table III-F-1 or Table III-F-2.

A9.4.2.2. Chapter 1, paragraph 1.13, *Increased Altitudes/Heights for Mountainous Terrain*. In addition, add 600 meters (or 1000 feet) to holding, MSA and ESA segments.

A9.4.2.3. Chapter 2, paragraph 2.6.2.1. VOR accuracies also apply to TACAN facilities.

A9.4.2.4. Chapter 3, *Arrival Segment*. Not applicable.

A9.4.2.5. Chapter 4, paragraph 4.3.3.1, *Area associated with dead reckoning*. GPD does not support the development of dead reckoning initial segments. Manual application of this paragraph is authorized.

A9.4.2.6. Chapter 4, paragraph 4.3.5, *Descent Gradient*. USAF GPD calculates descent gradients in percentages, which results in a violation when a descent gradient greater than 486 ft/NM is entered. Disregard the violation if the descent gradient is less than or equal to 500 ft/NM. For high altitude procedures, see AATCP-1(B), paragraph 311.a, and paragraph **A9.3.3.1.**.

A9.4.2.7. Chapter 5, paragraph 5.6, *Descent Gradient*. In order to correctly apply the 1.5 NM flat segment using GPD, a pseudo stepdown fix must be used.

A9.4.2.8. Chapter 6, paragraph 6.4.6.c, *Remote Altimeter Setting*. Not Applicable. Use AATCP-1(B), paragraph 233.

A9.4.2.9. Chapter 24, paragraph 24.1, *Precision Approach Radar (PAR)*. Not Applicable. Use USAF TERPS criteria for the final and missed approach segments. Also see paragraph **A9.3.2.2.**, paragraph **A9.3.5.** and AATCP-1(B), paragraph 238.

A9.4.2.10. Chapter 26, *VOR With Final Approach Fix (FAF)*. This chapter also applies to TACAN procedures. See AATCP-1(B), Chapter 5.

A9.4.2.11. Chapter 30, *MLS*. Not applicable. Use USAF TERPS criteria.

A9.4.3. Part V. Not applicable.

A9.4.4. Part VI. Not applicable.

A9.5. Criteria in addition to AATCP-1(B) and PANS-OPS.

A9.5.1. For manual applications, document other than nominal climb gradients associated with departures and missed approach segments in both percentages and feet per nautical mile. The same applies for non-standard descent gradients.

A9.5.2. Unless otherwise stated in PANS-OPS, the rise in secondary obstacle clearance surfaces is measured perpendicular to the nominal flight track.

A9.5.3. For construction of Category II/III procedures, manually enter obstacles into the appropriate database that represents aircraft taxiing, in holding bays, or taxiway holding positions.

A9.5.4. PANS-OPS Amendments 11 & 12 may be used when the amendment only adds explicit guidance to the current criteria.

Attachment 10

IC 2004-1 TO AFI 11-230, INSTRUMENT PROCEDURES

12 AUGUST 2004

This instruction implements AFPD 11-2, *Flight Rules and Procedures*. It provides guidance on establishing, approving, revising, or deleting instrument procedures. It will apply to flying activities at all airfields where the Air Force, or an Air Force component of a unified command conducts or supports instrument flight. Use this instruction in conjunction with AFMAN 11-226 (I), *US Standard for Terminal Instrument Procedures (TERPS)* and NATO APATC-1, *Criteria for the Preparation of Instrument Approach and Departure Procedures*.

Forward copies of all supplements for this instruction to the Air Force Flight Standards Agency, Director of Operations, Instrument Procedures (AFFSA/XOIP) for approval. For suggested changes to this instruction, use AF IMT 847, ***Recommendation for Change of Publication***. Send AF IMT 847 through channels to AFFSA/XOIP. AFI 11-215, *Flight Manual Procedures,* will govern processing of AF IMTs 847. Maintain and dispose of records created as a result of prescribed processes in accordance with AFMAN 37-139, *Records Disposition Schedule.*

SUMMARY OF REVISIONS

This revision incorporates interim change (IC) 2004-1 (**Attachment 10**). This revision includes changes contained in Change 19 to AFI 11-226(I) (throughout); implements use of USAF Global Procedure Designer (throughout); changes AF Form to AF IMT (throughout); updates office names and symbols (throughout); updates URLs for the USAF, Federal Aviation Administration, and National Geospatial-Intelligence Agency (throughout); updates the OPR and certified by lines (title page); details other governing directives for the USAF instrument procedure program (throughout); outlines the roles and responsibilities of HQ USAF (paragraph **1.1.**); outlines the roles and responsibilities of AFFSA/XOIP (paragraph **1.2.**); outlines the roles and responsibilities of MAJCOM TERPS functions (paragraph **1.3.**); outlines the roles and responsibilities of the MAJCOM or Air Force Component of a Unified Command, Director of Operations (paragraph **1.4.**); outlines the roles and responsibilities of the unit TERPS function (paragraph **1.5.**); updates procedures for developing, evaluating, and/or documenting holding patterns (paragraph **2.1.**), updates procedures for ensuring instrument procedures are separated from Special Use Airspace (paragraph **2.2.**), updates procedures for documenting navigational fixes (paragraph **2.3.**); updates procedures for developing, evaluating, and/or documenting NAVAID service volume (paragraph **2.4.**), updates guidance regarding airspace requirements and the environmental impact analysis process (paragraph **2.5.**); updates guidance for processing changes to magnetic variation (paragraph **2.6.**); updates VMC procedures to VFR procedures (paragraph **2.7.**); updates procedures for obtaining and processing FAA forms and publications and for evaluating new construction and alterations to current obstructions (paragraph **2.8.**), updates the wording regarding procedures requiring Special Aircrew Training (paragraph **2.9.**); updates departure and missed approach climb gradient application for CONUS and OCONUS locations (paragraph **2.10.**); updates departure procedure definitions (paragraph **3.1.**); adds a figure to illustrate the initial climb area construction (**Figure 3.1.**); deletes general guidelines for determining obstacle driven departure procedures (**Table 3.1.**); updates guidance for developing RNAV departures

(paragraph **3.2.**); updates guidance on application of departure procedure criteria (paragraph **3.3.**); modifies guidance for completing AF IMT 3634 (paragraph **3.4.**); deletes guidance for use of AF IMT 3635 (paragraph **3.5.**) and AF IMT 3636 (paragraph **3.6.**); updates guidance for standard terminal arrivals (paragraph **4.1.**), updates guidance for airborne radar approaches (paragraph **4.2.**), updates guidance for area navigation (paragraph **4.3.**); adds special use and VFR requirements to point in space procedures (paragraph **4.4.**); updates guidance for publishing ILS restrictions (paragraph **4.5.**); updates guidance for combining instrument procedures (paragraph **4.6.**); updates guidance on displaced threshold procedures (paragraph **4.7.**); updates guidance on side-step maneuver procedures (paragraph **4.8.**); adds sample side-step minima publication example (**Figure 4.1.**); updates guidance on airport surveillance radar approach procedures (paragraph **4.9.**); updates sample recommended altitude calculations (**Table 4.1.**); deletes guidance for ASR approaches that use PAR equipment at RFC only facilities (paragraph **4.10.**); updates guidance for best fit straight line application to threshold crossing height (paragraph **4.11.**); updates guidance for completing AF IMT 3637 (paragraph **4.12.**), updates guidance for documenting precision computations (paragraph **4.13.**); updates guidance for completing AF IMT 3640 (paragraph **4.14.**), AF IMT 3641 (paragraph **4.15.**), and AF IMT 3642 (paragraph **4.16.**); deletes guidance for AF Form 3981, GPS/RNAV Descent Angle and Surface Evaluations (paragraph **4.17.**); updates guidance for AF IMT 3982 (paragraph **4.18.**); updates procedures for requesting, processing, and publishing instrument procedures (paragraph **5.1.**); updates MAJCOM responsibilities (paragraph **5.2.**); updates workflow when processing standard instrument procedures (**Figure 5.1.**); updates workflow when processing nonstandard instrument procedures (**Figure 5.2.**); updates instrument procedure package content requirements (**Table 5.1.**); updates unit responsibilities (paragraph **5.3.**); updates MAJCOM Headquarters Director of Operations responsibilities (paragraph **5.4.**); updates waiver processing procedures (paragraph **5.5.**); updates guidance for completing AF IMT 3980 (paragraph **5.6.**); updates guidance for deleting instrument procedures (paragraph **5.7.**); updates guidance for processing special use instrument procedures (paragraph **5.8.**); updates guidance for maintenance of flight information publications (paragraph **6.1.**); updates guidance for revising instrument procedures (paragraph **6.2.**); updates guidance for review of flight information publications and other TERPS related data (paragraph **6.3.**); updates and expands guidance for publishing foreign terminal instrument procedures (paragraph **7.1.**); updates map scale requirements (**Table 7.1.**); updates the FTIP publication process (**Figure 7.1.**); updates procedures for aircrew use of foreign instrument procedures (paragraph **7.2.**); updates the process for reviewing FTIP (**Figure 7.2.**); updates flyability check and flight inspection requirements for foreign instrument procedures (paragraph **7.3.**); updates guidance for foreign procedure turns (paragraph **7.4.**); updates guidance on metric minima (paragraph **7.5.**); updates NOTAM guidance (paragraph **7.6.**); deletes guidance for applying APATC-1 (paragraph **7.7.**); updates flyability check guidance (paragraph **8.1.**); updates flight inspection guidance (paragraph **8.2.**); updates the controlling obstacle template example (**Figure 8.1.**); updates guidance for flight inspection of special use instrument procedures (paragraph **8.3.**); updates instructions for AF IMT 3992 (paragraph **8.4.**) and AF IMT 3993 (paragraph **8.5.**); updates guidance for developing minimum vectoring altitude charts (paragraph **9.1.**); replaces **Figure 9.1.**, *Minimum Vectoring Altitude Chart (MVAC) for Terminal, Single-Sensor Operations*, with *Correct Application of Prominent Obstacle Sector* (**Figure 9.1.**); replaces **Figure 9.2.**, *MVAC Sector Buffer Areas*, with *Incorrect Application of Prominent Obstacle Sector* (**Figure 9.2.**); replaces **Figure 9.3.**, *Minimum Vectoring Altitude Chart (MVAC) for Mosaic Multi-Sensor Radar Systems*, with *User Defined Note Annotating Mountainous Terrain Designation* (**Figure 9.3.**); replaces **Figure 9.4.**, *Mosaic Buffer Areas*, with *Digital VFR Sectional Spatial Reference Information* (**Figure 9.4.**); replaces **Figure 9.5.**, *Minimum Instrument Flight Rules Altitude Chart (MIFRAC)*, with *GPD Display Parameters Dialogue* (**Figure 9.5.**); replaces **Figure 9.6.**, *MIFRAC Sector Buffer Areas*, with *MVAC Sectors in GPD Chart Designer with VFR Sectional and ATC Delegated Air-*

space (**Figure 9.6.**); adds illustration of Minimum Vectoring Altitude Chart Standard/Irregular/Polygonal/ Prominent Obstacle Sectors (**Figure 9.7.**); adds illustration of Minimum Vectoring Altitude Chart with Polygonal Sectors (**Figure 9.8.**); updates guidance for developing minimum instrument flight rules altitude charts (paragraph **9.2.**); adds illustration of NAVAID restrictions (**Figure 9.9.**); adds illustration of MIFRAC Sectors in GPD Chart Designer with VFR Sectional (**Figure 9.10.**); adds illustration of MIFRAC Sectors in GPD Chart Designer with MVAC (**Figure 9.11.**); updates guidance for chart documentation and processing (paragraph **9.3.**); deletes guidance for use of AF Form 3633 (paragraph **9.4.**); updates guidance for Category I MLS procedures (paragraph **10.1.**); updates guidance for mobile MLS procedures (paragraph **10.2.**); updates operational limits of the MMLS (**Figure 10.1.**); deletes guidance for AF Form 3979 (paragraph **10.3.**); deletes TCH upper limits table (**Table 10.1.**); deletes glideslope angles and associated descent gradients table (**Table 10.2.**); deletes military standard MMLS precision landing minimums table (**Table 10.3.**); outlines guidance for TERPS automation software (paragraph **11.1.**); establishes USAF GPD hardware requirements (paragraph **11.2.**); details recommended USAF GPD hardware requirements (**Table 11.1.**); outlines procedures for the establishment of initial USAF GPD capability (paragraph **11.3.**); adds minimum USAF GPD hardware requirements (**Table 11.2.**); adds USAF GPD laptop requirements (**Table 11.3.**); outlines USAF GPD initial adaptation workflow (**Table 11.4.**); introduces horizontal and vertical accuracies as determined by map source (**Table 11.5.**); replaces paragraph **11.4.**, *AF FORM 3628, TERPS Automation Data Summary*, with *Additional GPD Considerations/Miscellaneous* (paragraph **11.4.**); replaces **Figure 11.1.**, *Displaced Threshold Examples, RWY 09*, with *Runway Physical/Landing/Takeoff /Displacement Lengths* (**Figure 11.1.**); replaces **Figure 11.2.**, *Obstacle Identification Area (OIA) -- Obstacles Within 10 NM of ARP*, with *Runway Physical/Landing/Takeoff/Displacement Lengths in GPD* (**Figure 11.2.**); replaces **Figure 11.3.**, *OIA - 10 NM to 30 NM Area*, with *Omni-directional NAVAID Radio Class* (**Figure 11.3.**); replaces **Figure 11.4.**, *OIA - 30 NM to 60 NM Area*, with *Airport NAVAIDs (example ILS)* (**Figure 11.4.**); replaces **Figure 11.5.**, *OIA - 60 NM to 100 NM Area*, with *Fix Data for 'LEMAY' from FAA Order 7350.7, Location Identifiers* (**Figure 11.5.**); replaces **Figure 11.6.**, *Chart Scales and Equivalents*, with *Fix/Waypoint Supplemental Data for 'LEMAY' in Data Manager* (**Figure 11.6.**); adds illustration on adjustment of obstacle height based on vertical accuracy (**Figure 11.7.**); adds illustration depicting adjustment of obstacle location based on horizontal accuracy (**Figure 11.8.**); adds illustration depicting GPD terrain analysis incomplete warning (**Figure 11.9.**); adds illustration depicting area with missing terrain data (**Figure 11.10.**); adds illustration depicting how to determine the contour elevation using VMAP (**Figure 11.11.**); deletes guidance for completing AF Form 3629, Obstruction Data (paragraph **11.5.**); updates guidance for use of hand-held GPS receivers (paragraph **11.6.**); deletes general obstacle charting and map information (paragraph **11.7.**); deletes guidance for handling Digital Terrain Elevation Data (paragraph **11.8.**); deletes guidance for handling Digital Vertical Obstruction File data (paragraph **11.9.**); deletes guidance for handling Chart Updating Manual/Electronic Chart Updating Manual information (paragraph **11.10.**); deletes guidance on construction or alteration of obstruction evaluations (paragraph **11.11.**); deletes guidance for FAA Form 8240-22 (paragraph 11.12); replaces paragraph **12.1.**, *TERPS Training*, with *Training Responsibilities* (paragraph **12.1.**); replaces paragraph **12.2.**, *Forms Prescribed*, with *Prescribed Training* (paragraph **12.2.**); updates the Glossary of References and Supporting Information with new terms, abbreviations, acronyms, and references (**Attachment 1**); replaces paragraph **A3.1.**, *AFMAN 11-226(I), Volume 1, paragraph 5b, Circling*, with *AFMAN 11-226(I), Volume 1* (paragraph **A3.1.**); adds illustration on determining straight-in MAP-to-threshold distance (**Figure A3.2.**); adds illustration on determining circling MAP-to-threshold distance (**Figure A3.3.**); adds illustration on determining the effect of facility distance on circling visibility minimums (**Figure A3.4.**); replaces paragraph **A3.2.**, *AFMAN 11-226(I), Volume 1, paragraph 122a, Airport*, with *AFMAN 11-226(I), Volume 3* (paragraph **A3.2.**); adds illustration depict-

ing the portion of clear zone affecting CAT I minimums (**Figure A3.5.**); replaces paragraph **A3.3.**, *AFMAN 11-226(I), Volume 1, paragraph 141, Nonstandard Procedures*, with *Category II/III ILS Precision Minimums Requirements* (paragraph **A3.3.**); adds illustration depicting lowest CAT II minimums (**Table A3.1.**); adds illustration depicting how to calculate radio altimeter height (**Figure A3.6.**); adds illustration depicting the Section 1A touchdown area (**Figure A3.7.**); adds illustration depicting Section 1B (**Figure A3.8.**); adds illustration depicting Section 1C (**Figure A3.9.**); adds illustration depicting section 2, non-RNAV (**Figure A3.10.**); adds two illustration depicting the turning missed approach (**Figure A3.11.**) and (Figure A3.12); deletes guidance in paragraphs **A3.4.** through **A3.35.**; adds reference to **Figure A4.4.** in paragraph **A4.1.**, GPI, RPI, TCH Computations (paragraph **A4.1.**); corrects **Figure A4.4.**, *PAR RPI Distance from Runway Threshold* (**Figure A4.4.**); updates paragraph **A4.6.**, *True/Magnetic Azimuth Conversions* (paragraph **A4.6.**); updates **Table A4.1.**; updates **Table A4.2.**; updates paragraph **A4.10.**, *Calculating Missed Approach Climb Gradients* (paragraph **A4.10.**); replaces **Attachment 5**, *Checklist for Review of Host Nation AIPs (Accredited Nations)*, with *Checklist for Review of Host Nation Instrument Procedure Programs and Airports* (**Attachment 5**); deletes **Attachment 6**, *Checklist for Special Accreditation of Host Nations/Airports* (**Attachment 6**); replaces **Attachment 7**, *Checklist for Review of Foreign Terminal Instrument Procedures*, with *Checklist for Review and/or Publication of Foreign Terminal Instrument Procedures* (**Attachment 7**); updates **Attachment 8**, *Instrument Procedure Flyability Check Instructions* (**Attachment 8**); replaces **Attachment 9**, *Horizontal Datum Codes*, with *Use of International Criteria* (**Attachment 9**). IC 2004-1 is the last attachment of this publication.

OPR: AFFSA/XOIP (Mr. Michael R. Clayton)

Certified by: HQ USAF/XOO (Maj Gen Teresa M. Peterson)

Chapter 1

RESPONSIBILITIES

1.1. HQ USAF Responsibilities. HQ USAF/XOO has delegated the authority for approving criteria in AFMAN 11-226(I), *United States Standard for Terminal Instrument Procedures (TERPS),* NATO AATCP-1(B), ICAO PANS-OPS, and this instruction to AFFSA/XOIP.

1.2. AFFSA/XOIP Responsibilities.

1.2.1. Reviews nonstandard instrument procedures and completes waiver documentation for AFFSA/CC approval.

1.2.2. Approves standard instrument procedures. AFFSA/CC delegates this authority to the major command (MAJCOM) TERPS functions.

1.2.3. Maintains liaison, affects 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.

1.2.4. Develops instrument procedure criteria and sets policy in support of the USAF TERPS Program as a result of ongoing operational needs and/or as requested by HQ USAF or MAJCOMs; tests and evaluates criteria at the direction of HQ USAF.

1.2.5. Validates and approves foreign nation's instrument procedure development and publication practices under the guidelines established in the USAF Foreign Terminal Instrument Procedures (FTIP) Acceptance Program (see **Chapter 7** for limitations).

1.2.6. Informs the National Geospatial-Intelligence Agency (NGA) which USAF TERPS functions may publish, delete, or revise instrument procedures, including FTIP.

1.2.7. Develops and maintains agreements with NGA outlining the data required for publication and maintenance of instrument procedures, including FTIP.

1.2.8. Develops and maintains agreements with the Federal Aviation Administration (FAA) Flight Standards office outlining the requirements for processing USAF instrument procedures at US civil airports IAW FAA Order 8260.32.

1.2.9. Maintains a listing of instrument procedures by location, type of procedure, and requiring commands.

1.2.10. Determines requirements and provides clarification/interpretation relating to application of criteria as it relates to Global Procedure Designer (GPD) software. Maintains liaison with AFFSA/XR and the Software Program Office (ESC) to prioritize criteria implementation and change control. Establishes and maintains the AFFSA GPD help desk.

1.2.11. Provides direction and information pertinent to instrument procedures and aeronautical information publications on an as-needed basis.

1.2.12. Defines curriculum items used for the development of the E3AZR1C171-000 and E3OZR13M4-000 TERPS Course Training Standard (CTS). These curriculum items and TERPS training requirements are communicated to AFFSA/XA for implementation.

1.2.13. Reviews and approves MAJCOM supplements to this instruction.

1.2.14. Develops and maintains the TERPS Checklist in AFI 13-218, *Air Traffic System Evaluation Program*.

1.2.15. Develops and maintains AFMAN 13-215, *ATC RADAR Maps and Associated Systems*.

1.3. MAJCOM TERPS Responsibilities.

1.3.1. Develop, review, approve, and submit for publication/implementation instrument procedures for locations within their TERPS Area of Responsibility (AOR) to include supported unit's Minimum Vectoring Altitude Chart (MVAC), Minimum IFR Altitude Chart (MIFRAC), and Diverse Vector Area (DVA).

1.3.1.1. The MAJCOM responsible for the TERPS AOR may delegate final TERPS review and approval authority for standard instrument procedures to group and wing level, combat communications units, and TERPS Unit Type Code (UTC) packages when these units are deployed within their AOR to support unique theater requirements for short-notice operations.

1.3.1.1.1. When considering delegation of this authority, the granting MAJCOM shall coordinate with the unit's parent MAJCOM, when other than the granting MAJCOM, for comments.

1.3.1.1.2. The granting MAJCOM shall inform AFFSA/XOI, and, if applicable, the parent MAJCOM, when this authority is delegated.

1.3.1.1.3. When this authority is delegated, deployed units shall forward a copy of the procedure package to the MAJCOM TERPS function responsible for the location.

1.3.1.1.4. Deployed organizations supporting long-term exercises/operations will not normally be delegated this authority and will process instrument procedures through the MAJCOM TERPS function responsible for the location according to **Chapter 5** of this instruction.

1.3.1.1.5. All nonstandard procedures developed by the deployed unit will be processed through the MAJCOM TERPS function responsible for the location IAW paragraph **5.5.**.

1.3.2. Coordinate with another MAJCOM or AFFSA/XOIP for review and signature when situations occur that preclude a MAJCOM TERPS review by other than the procedure designer, and no other qualified person is available to complete the MAJCOM review.

NOTE: The MAJCOM TERPS function shall determine who is and/or is not qualified to complete the MAJCOM review. When performing the review, the reviewing agency shall consider the applicable MAJCOM supplement to this instruction.

1.3.3. Provide technical and procedural development assistance when requested by supported units.

1.3.4. Validate the accuracy, adequacy, safety, and practicality of each instrument procedure within their jurisdiction. While validating these items, consider:

1.3.4.1. Past, current, and intended usage by type of aircraft.

1.3.4.2. Climate and topography affecting the terminal area.

1.3.4.3. Whether the procedure is a special, restricted, or public use procedure.

1.3.4.4. Flight inspection of the procedure by a US agency or host country that adheres to US or ICAO Annex 10 flight inspection standards.

1.3.4.5. Validation of the procedure by a US agency for other US users.

1.3.4.6. The nature of deviations that make the procedure nonstandard.

1.3.5. Investigate and ensure remedial action is taken with respect to any procedure deficiency or reported hazard, including restrictions or emergency revisions to procedures within their jurisdiction.

1.3.6. Ensure a FLIP maintenance system (checklist, operating instructions, etc.) has been established that tracks procedural changes, AIP changes (host nation locations), NOTAMs, CHUM data, and related correspondence used for updating instrument procedures.

1.3.7. Implement processes for review of Foreign Terminal Instrument Procedures (FTIP) IAW **Chapter 7** of this AFI, as applicable. Review instrument procedures that are not published in the DoD or NACO FLIP prior to the procedure(s) being used unless the review has been waived (see paragraph **7.2.7.**).

1.3.8. Maintain a copy of each approved procedure package to include all supporting documentation IAW paragraph **5.3.**.

1.3.9. Maintain a current listing of all published instrument procedures (military and civil) that are published in the DoD or NACO FLIP, special use instrument procedures published in loose-leaf format, and all associated waivers using the AFFSA spreadsheet format. Each MAJCOM TERPS function shall provide a complete and current listing to AFFSA/XOIP by 15 October annually.

1.3.9.1. In addition to instrument procedures developed by the USAF, include instrument procedures developed at the request of the USAF by the FAA at domestic civil airports IAW guidance outlined in FAA Order 8260.32.

1.3.9.2. MAJCOMs shall initiate action to have instrument procedures that do not appear on this listing removed from FLIP.

1.3.9.3. Establish and maintain a current set of aeronautical source data sufficient to meet MAJCOM TERPS review and approval responsibilities. At a minimum, create a GPD globalspace containing the most current DAFIF and DVOF, and all available DTED/SRTM covering the area(s) encompassing subordinate/supported unit's workspaces. Develop workspaces that duplicate those maintained by subordinate/supported units. Initiate GPD Automated Evaluation (Auto Eval) on each workspace and all active archived procedures/charts after ingest of new aeronautical data (DTED/DVOF/DAFIF).

NOTE: Develop and maintain workspaces to support FTIP review IAW **Chapter 7** of this instruction.

1.3.9.3.1. Digital products required to support MAJCOM review and approval include DAFIF, DVOF, DTED (Level 1 and 2, and SRTM data, when available), and NACO digital VFR sectionals. Raster map/imagery products (CADRG and CIB), and vector products (UVMAP and VMAP 0 – 1) as deemed necessary.

1.3.9.3.2. Establish a formal process to ensure all manual edits to aeronautical/obstacle data made by subordinate TERPS functions are submitted to the MAJCOM for review/approval and integration into the GPD globalspace. Additionally, this process must ensure that all manual edits are submitted to the AFFSA GPD help desk for NGA action. Document this process in the appropriate MAJCOM supplement.

1.3.10. Provide AFFSA/XOIP a copy of the MAJCOM supplement to this instruction for review and approval.

1.3.11. Submit suspected problems and/or recommendations for GPD software enhancements to the AFFSA GPD help desk.

1.3.12. Perform site visits where the MAJCOM has assumed the supported unit's TERPS function.

NOTE: MAJCOMs that have assumed their supported unit TERPS function shall meet all unit TERPS function responsibilities as outlined in paragraph **1.5.**.

1.3.13. Perform host nation accreditation, as applicable, IAW **Chapter 7** of this instruction.

1.3.14. Comply with requirements IAW FAA Order 8260.32, as applicable. Exceptions to requirements outlined in FAA Order 8260.32 shall be documented in a MOA between the FAA and the applicable MAJCOM.

1.3.15. MAJCOM TERPS Areas of Responsibility.

1.3.15.1. Pacific Air Forces (PACAF) is responsible for instrument procedure requirements in the geographical area covered by the Alaska FLIP; the Pacific, Australasian, and Antarctica (PAA) FLIP (except as noted in paragraph **1.3.15.5.**); and the Eastern Europe and Asia (EEA) FLIP (East of E 88° longitude). The PACAF TERPS AOR also includes India, Pakistan, Nepal and Afghanistan.

1.3.15.2. United States Air Forces Europe (USAFE) is responsible for instrument procedure requirements in the geographical area covered by the Europe, North Africa, and Middle East (ENAME) FLIP, and the Eastern Europe and Asia (EEA) FLIP (West of E 88° longitude).

1.3.15.3. Air Education and Training Command (AETC) is responsible for locations under their operational control and for instrument procedure requirements in the geographical area covered by the Canada and North Atlantic (C & NA) FLIP.

1.3.15.4. Air National Guard (ANG), Air Force Reserve Command (AFRC), Air Combat Command (ACC), Air Mobility Command (AMC), Air Force Space Command (AFSPC), Air Force Special Opera-

tions Command (AFSOC), and Air Force Materiel Command (AFMC) are responsible for locations under their operational control.

1.3.15.5. Air Mobility Command (AMC) is responsible for instrument procedure requirements in Antarctica IAW established Memorandum of Understandings with the National Science Foundation for Operational and Logistics Support of the Polar Programs, AFFSA, and other participating MAJCOMs.

NOTE: HQ AMC has delegated AMC AOS/OL-J the MAJCOM TERPS authority and responsibility for instrument procedure requirements in the geographical area covered by the Caribbean, Central, and South American (CC & SA) FLIP.

1.3.15.6. Exceptions to the areas of responsibility outlined above shall be documented in the applicable MAJCOM supplement to this instruction.

1.4. MAJCOM or Air Force Component of a Unified Command, Director of Operations/JFACC/CFACC Responsibilities.

1.4.1. Ensures operational expertise is available to assist the unit level TERPS function in developing, reviewing/validating, and revising instrument procedures.

1.4.1.1. During contingency operations, the air component commander may request the establishment of an in-theater TERPS cell for the purpose of developing and/or approving instrument procedures.

1.4.1.2. Additionally, during contingency operations, the Combined Force Air Component Commander (CFACC)/Joint Force Air Component Commander (JFACC) may elect to establish an in-theater TERPS liaison element (TLE) within the ATC Cell to coordinate a unified, theater-wide, TERPS effort.

1.4.1.2.1. The TLE should be staffed with MAJCOM TERPS specialists from one or more of the applicable MAJCOM TERPS functions to facilitate the contingency TERPS effort.

1.4.1.2.2. Paragraph **5.1.7.** provides guidance on processing instrument procedures during contingency operations.

1.4.2. Ensures a flyability check is performed for procedures to be published in the DoD FLIP.

1.4.3. Ensures each procedure is operationally acceptable for the command or unit mission to include evaluation and endorsement each nonstandard procedure.

1.4.4. Ensures civil engineering (CE) or other appropriate agencies provide obstacle and airfield engineering data to support the development and maintenance of required instrument procedures. Engineering maps from the Base Comprehensive Plan are an example of these data.

1.5. Unit TERPS Responsibilities.

1.5.1. Initiate actions essential to the fulfillment of TERPS program objectives assigned by the applicable MAJCOM TERPS function and appropriate directives. When safety or practicality of air navigation is a factor, the TERPS specialist cognizant of the situation will take action to correct the situation.

1.5.2. Establish and maintain a current set of aeronautical source data sufficient to support TERPS development responsibilities. At a minimum, create a GPD globalspace containing the most current DAFIF and DVOF and all available DTED covering each active workspace. Create a workspace (or workspaces) large enough to encompass an area at least 5 NM beyond the area to be protected for the furthest segment/sector of any instrument procedure or chart developed using automation. For example, when the furthest segment of any automated procedure/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. Initiate GPD

Auto Eval on the workspace and all archived procedures after ingest of new aeronautical data (DTED/DVOF/DAFIF).

1.5.2.1. Digital products required to support TERPS development include DAFIF, DVOF, DTED (Level 1 and 2, and SRTM data if available), NACO digital VFR sectionals, raster map/imagery products (CADRG, CIB), and vector products (UVMAP, VMAP 0 – 1).

1.5.2.2. Maintain source data (hard- or soft-copy) relating to aeronautical or ATCALS surveys, NAVAID/radar siting, and obstructions (on- and off-aerodrome), and all correspondence relating to manual revisions to aeronautical data.

1.5.3. Develop, process, and maintain instrument procedures to support local flight operations. Prepare procedure packages for instrument approaches, instrument departures (to include diverse departure assessments, ODPs, and SIDs), and Standard Terminal Arrival Routes using the most current version of GPD software or manual methods, as applicable. Coordinate with all required signatory agencies. Maintain backup copies of all files associated with automated procedure packages on electronic media.

1.5.4. Develop, process, and maintain ATC charts to include Minimum Vectoring Altitude Charts (MVAC), and Minimum IFR Altitude Charts (MIFRAC) to support local USAF ATC facilities. Prepare chart packages using the Chart Designer module of the most current version of GPD software and coordinate with all required signatory agencies. Maintain backup copies of all files associated with automated chart packages on electronic media.

NOTE: Provide notification of new and revised instrument procedures to the installation environmental management (EM) office for environmental impact analysis. Notify wing Airspace Management, when applicable, of new and revised instrument procedures for their evaluation of any effect to local Special Use Airspace or Military Training Routes (MTRs).

1.5.5. Develop, process, and maintain Diverse Vector Areas (DVA) when requested by the Radar CCTLR.

1.5.6. Coordinate all manual edits to aeronautical data (to include obstacles) with the MAJCOM TERPS function.

1.5.7. Maintain TERPS publications IAW **Attachment 1**. Maintain TERPS files IAW USAF, MAJCOM, and wing/base directives.

1.5.8. Develop and maintain a continuity folder including, as a minimum (see MAJCOM supplement, if applicable) the following:

1.5.8.1. Key Personnel.

1.5.8.2. Projects in Progress.

1.5.8.3. Procedure Listing (A current copy of the AFFSA annual audit spreadsheet is acceptable).

1.5.8.4. TERPS Equipment Listing.

1.5.8.5. Listing of Local References (Wing Instruction, DVA OI, ATC Non-Radar training material that may contain rational for TERPS restrictions, etc.).

1.5.8.6. File Maintenance and Disposition Plan.

1.5.8.7. FLIP Cycle Review Log.

1.5.8.8. Copy of completed Annual/Semiannual Self-Inspection ATSEP Checklist. See AFI 13-218, *Air Traffic System Evaluation Program* or the AFFSA/XA website for the latest checklist.

1.5.8.9. Historical listing of all manual changes to aeronautical data, to include the source data, reason for revision, and impact (if none, so state).

1.5.9. Maintain current civil engineering produced (electronic or hard-copy) maps of the following type.

NOTE: CE may maintain Comprehensive Plan maps in a digital or electronic format. MAJCOM and unit TERPS specialists may use any Comprehensive Plan map provided by CE in the digital format or produce paper copy maps from the medium provided by CE.

1.5.9.1. E-1, E-2, and E-3.

1.5.9.2. E-5. Ensure the following items ('layers', as applicable, when working in a GIS format) are included.

1.5.9.2.1. Primary Installation (to the edge of the base property & easements as necessary). This is a plan of existing facilities on the installation. It will be compiled at a scale of 1 inch = 400 feet and will accurately depict the following information.

1.5.9.2.1.1. Runway thresholds latitude and longitude, touchdown zone elevation(s), all NAVAID locations with latitude and longitude.

1.5.9.2.1.2. The designation of the instrument runway. The length, width, true bearing, directional numerals, lateral clearances, clear zones, approach zones, glideslope critical areas, and centerline of each runway shall be included.

1.5.9.2.1.2.1. Location and type of runway, taxiway, threshold, approach, narrow gauge, and centerline light fixtures.

1.5.9.2.1.2.2. Location of runway distance marker system, runway end reference lights, and VASI systems.

1.5.9.2.1.3. Topography (contour interval generally 5 feet and subdued but printable) including vegetation, trees (single and groves, forests, etc).

1.5.9.2.1.4. Existing facilities such as airfield pavements, structures above ground to include all portable buildings (all above ground structures must have building height included), inclusive of utility lines with utility pole height in the layer or on the 'legend' as well as street lighting, apron maintenance lighting, etc. Each structure should be identified by the installation address system and building number.

1.5.9.2.1.5. Streets, parking areas (aircraft & vehicle).

1.5.9.2.1.6. Roads, taxiways, railroads, fuel hydrant outlets, antennas, etc. Taxiways shall be identified by number or letter.

1.5.9.2.1.7. Aircraft maintenance light poles or towers, blast deflectors, and aircraft fueling and defueling outlets.

1.5.9.2.1.8. Helicopter landing areas and clearances applicable for same.

1.5.9.2.2. Facilities located at off-installation sites will be shown at an appropriate scale as insets or on additional sheets, as required.

1.5.9.3. All coordinates must be expressed in the WGS 84 coordinate system to at least the second place past the decimal, with the map being associated to this coordinate system. The State Plane Coordinate System is not an acceptable aeronautical survey format.

1.5.9.4. Verify each map is current annually.

1.5.9.5. If these maps are not available (e.g., FAA provides engineering support), suitable substitutes such as National Geodetic Survey (NGS), Airport Obstruction Charts (AC) and the associated NOAA Aeronautical Data Sheet (ADS) are acceptable. Other engineering maps are optional.

NOTE 1: AFI 32-7062, ***Air Force Comprehensive Planning,*** provides Comprehensive Plan map guidance.

NOTE 2: The CE function is responsible for updating CE products and providing these products to the TERPS function. TERPS functions shall not update CE products. Any USAF developed instrument procedure based on CE airfield obstacle data or a Comprehensive Plan map that has not been updated by CE for more than 2 years requires a waiver from the appropriate MAJCOM/DO for continued use. The applicable TERPS function shall ensure that the appropriate CE function is notified of outdated maps.

1.5.10. Complete FAA Form 8240-22, ***Facility Data Sheet.*** Processing guidance for this form is outlined in **Chapter 2**.

1.5.11. Prepare FAA Form 6050-4, ***Expanded Service Volume Request,*** as required. Completion and processing guidance for this form is outlined in **Chapter 2**.

1.5.12. Review and document procedural data in each new FLIP product is correct IAW paragraph **6.3.** of this AFI.

1.5.13. Complete Section I of AF IMT 813 to initiate the Environmental Impact Analysis Process (EIAP).

1.5.14. Develop ATC radar map data in coordination with the Chief Controller (CCTLR), and the Chief Air Traffic Control Automation (CATCA/ATCSS) IAW AFMAN 13-215.

1.5.15. Provide notification to the CATCT, CSE, TSN, CATCA, CCTLR, and the appropriate FAA facility manager of any revision to an instrument procedure.

1.5.16. Analyze obstruction evaluation (OE) case studies to determine the effects on current and planned instrument procedures and/or ATC charts.

1.5.17. Ensure Airfield Management is provided data on instrument procedures requiring NOTAM action.

1.5.18. Conduct visual inspections of the airfield environment or coordinate with Airfield Management for information relating to new, changed, or removed obstructions.

Chapter 2

TERPS GENERAL

2.1. Holding Pattern Development. Apply holding pattern requirements established in FAA Order 7130.3, *Holding Pattern Criteria,* AFMAN 11-226(I), Volume 1, Chapter 2, Section 9, and the following:

2.1.1. Develop holding patterns to accommodate a maximum holding airspeed of 310 knots indicated airspeed (KIAS). If this cannot be accomplished, the maximum airspeed allowed shall be published in the plan view of the procedure, adjacent to the holding pattern.

2.1.2. When designing a new procedure, select the maximum holding altitude based on the highest anticipated altitude that will be used by ATC.

2.1.3. At locations where the USAF has instrument procedure development responsibility, military and FAA ATC facility management, including adjacent facilities with Approach Control responsibility, shall

be made aware of all limitations (maximum speed and/or altitude) associated with each holding pattern. When applicable, provide any restrictions related to turbulent air holding. See FAA Order 7130.3, Chapter 3 for additional guidance.

2.1.4. Evaluate holding patterns based on the DME slant range effect regardless of the altitude specified or the difference between slant range and geographical distance.

2.1.5. Holding patterns shall be documented on FAA Form 8260-2, ***Radio Fix and Holding Data Record*** (see paragraph **2.3.5.**).

2.2. Separating Instrument Procedures From Special Use Airspace (SUA). Ensure that a SUA check is performed on all procedures developed in GPD prior to export (not applicable to ATC charts or diverse departures). Primary obstacle clearance areas of instrument approach procedures and SIDs (with the exception of ESA and MSA) shall not extend into SUA *except when one or more* of the following conditions exist:

2.2.1. The ATC facility authorized to clear aircraft for the instrument procedure is designated as the controlling agency for the SUA.

2.2.2. ATC radar is operational and used to ensure separation from the SUA in those cases where the ATC facility has control responsibility for the instrument procedure, but is not the controlling agency for the SUA (see FAA Order 7110.65, Chapter 9, Section 4, *Special Use and ATC Assigned Airspace* for additional guidance).

NOTE: When ATC radar is used, the procedure must specify the restrictions, e.g., "RADAR REQUIRED" or "RADAR REQUIRED WHEN HOLDING ABOVE 10,000."

2.2.3. 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 and non-participating aircraft performing the instrument procedure.

NOTE: Coordinate with the local military airspace manager for matters concerning Special Use Airspace (SUA). Coordinate with the supporting MAJCOM and with the FAA AFREP for all other airspace matters.

2.2.4. When the GPD SUA check indicates a conflict that will be mitigated by one or more of the rules in paragraphs **2.2.1.**, **2.2.2.**, or **2.2.3.** above, enter the details in the 'Justification' tab. For example: "IAW AFI 11-230, para **2.2.1.**, XYZ Approach Control is the controlling agency for R-3202A and for the instrument procedure". Completion of the 'Alternative', 'Equivalent', or 'Organization' tabs is only required when pursuing a waiver.

2.3. Navigational Fixes. Requirements established in FAA Order 8260.19, Chapter 2, Section 10, *Navigational Fixes*, and as supplemented in this paragraph, shall be used for fix processing. The Unit TERPS function shall submit a request for fix names through their supporting MAJCOM. The MAJCOM TERPS function shall obtain fix names from the FAA National Flight Data Center (NFDC), Airspace Section.

2.3.1. Fix names shall be documented on FAA Form 8260-2, ***Radio Fix and Holding Data Record*** (see paragraph **2.3.5.**).

2.3.2. Assign NFDC obtained fix names to all navigation fixes developed for en route and terminal instrument flight procedures IAW FAA Order 8260.19, Chapter 2, Section 10. This is necessary to ensure har-

monization between information depicted on aeronautical charts and the corresponding data documented in aeronautical databases.

2.3.3. Unit TERPS functions will notify their supporting MAJCOM when fix names are no longer required. Fix names no longer required will be returned to the NFDC by the MAJCOM.

2.3.4. Fix names obtained by the MAJCOM from NFDC for navigational fixes overseas shall be coordinated with and approved by the country with jurisdiction over the airspace where the fix is located prior to publishing the procedure in the DoD FLIP. These fix names shall be documented and processed IAW paragraph **2.3.**. MAJCOMs shall specify procedures for coordinating with host nation aviation authorities to obtain approval and to delete fix names no longer needed in a supplement to this AFI.

2.3.5. Use the following web site **http://av-info.faa.gov/terps/TERPS%20Forms.htm** to download FAA Form 8260-2. The instructions for completing this form are located in FAA Order 8260.19, Chapter 8.

2.3.5.1. The unit TERPS function will complete the FAA Form 8260-2 and forward the form through their supporting MAJCOM for processing IAW FAA Order 8260.19. The completed FAA Form 8260-2 must be forwarded by the MAJCOM to AVN-160.

2.3.5.2. FAA Form 8260-2's supporting RNAV procedures shall be processed and approved by AVN-160 prior to publishing the procedure. Non-RNAV instrument procedures may be published once fix names have been obtained/reserved through the NFDC.

2.3.5.3. When processing FAA Form 8260-2, ensure the form is coordinated with the parent FAA or military air traffic facility, as appropriate, in Item 6, ATC COORDINATION, prior to being forwarded to the supporting MAJCOM.

2.3.5.4. When submitting an instrument procedure to NGA for publication or revision, the MAJCOM shall include all applicable approved 8260-2's with other required documentation.

2.4. NAVAID Service Volume. See GPD Operations Manual Vol. II, Chapter 8. Ensure that a NAVAID service volume check is performed on all non-RNAV procedures developed in GPD prior to export (not applicable to ATC charts or diverse departures). NAVAID standard service volumes are listed in FAA Order 8260.19 and FAA Order 7110.65. When the primary area of any segment (including holding) extends beyond the standard service volume of the applicable NAVAID(s), an Expanded Service Volume (ESV) evaluation is required. Document ESV requests on FAA Form 6050-4.

2.4.1. A blank (fillable) FAA Form 6050-4 is included in each GPD export package. Alternatively, it may be downloaded from **http://www.faa.gov/ats/aaf/asr/library/downloads.htm**. Complete Part I of FAA Form 6050-4, ***Expanded Service Volume Request*** as follows;

2.4.1.1. Enter your complete office symbol; include mailing address in the 'From *(Originating Office)*' space. Include the airspace docket number only if the request is associated with an airspace action. Enter the state where the NAVAID is located. Check 'establish', 'revision', or 'cancel', as appropriate.

2.4.1.2. Facility Data. Enter the NAVAID facility name (as charted) and identifier in the 'Chart Name' space. Also enter the facility class and type (i.e.; T-VOR; L-DME; H-VORTAC), the city where the NAVAID is located, and the frequency/channel of the NAVAID.

2.4.1.3. Expanded Service Volume Data. Enter the radial(s), distance, minimum and maximum MSL altitudes desired, and the operational use requirements that are beyond the standard service volume. The

name and rank of the procedure specialist shall be printed under the specialist's signature. Enter the individual's organization and office symbol in 'Facility', and enter the date of the request.

2.4.1.4. Do not make any entries in Parts II or III.

2.4.1.5. Forward the completed form to your supporting MAJCOM for further processing.

2.4.2. The MAJCOM shall validate the requirement and submit it to the appropriate regional AFREP who shall forward the request to the Regional Frequency Management Officer (FMO). The FMO shall determine if the desired frequency protections can be guaranteed. The FMO will also do an engineering analysis to determine whether or not the signal strength, provided at the worst-case points of the service volume, complies with spectrum management minimum principle requirements. The FMO will indicate approval or provide alternatives to limitations for ESV checks. A flight inspection will be performed to confirm the engineering analysis and to determine that a usable, interference free signal is available throughout the desired volume of airspace.

NOTE: Frequency management guidance can be found in FAA Order 6050.32, Spectrum Management Regulations and Procedures Manual.

2.4.3. When the ESV request is reviewed and approved by all required agencies, file the request with all affected instrument procedures. When there is no longer a requirement for an established ESV, the originating office shall cancel it and notify all concerned agencies. ESVs shall be reviewed at least biennially to validate the requirement.

2.4.4. Consider restrictions to NAVAIDs when developing instrument procedures. All segments of the instrument procedure shall fall within useable radials/ranges of the applicable NAVAID.

2.5. Airspace Requirements. Ensure each instrument procedure's 'primary obstruction clearance area' is within controlled airspace within the United States and where required by host nation regulations. The following criteria apply:

2.5.1. Altitudes or heights established must be at least 300 feet above the Floor of Controlled Airspace (FOCA), except that these altitudes or heights may be rounded to the nearest 100 feet. Outside the United States, procedures must be contained within controlled airspace according to host nation criteria.

2.5.2. Outside of Class C/D airspace (and extensions) and Class E airspace use ATC IFR separation standards (see FAA Order 7110.65, Chapters 5 and 6).

2.5.3. In Class C/D airspace (including extensions) and Class E airspace use the criteria in FAA Odrer 7400.2 and FAA Order 8260.19.

2.5.4. Ensure all circling areas remain within the lateral confines of Class D/E Surface Areas and/or extensions. When not possible, publish Circling Minimum Descent Altitudes (CMDA) at least 300 feet above the FOCA.

NOTE: When raising the published CMDA only to accommodate FOCA requirements (not obstacles), a flight inspection is *not* required.

2.5.5. When new or revised instrument procedures require establishing or changing airspace, contact the regional AFREP.

2.5.6. When using GPD, display digital VFR sectionals to assist in evaluating instrument procedures against the FOCA (see **Chapter 9**, paragraph **9.1.3.4.1.**).

2.5.7. Environmental Impact Analysis Process. Complete Section I of AF IMT 813 to initiate the Environmental Impact Analysis Process (EIAP) when making altitude or flight track changes to existing instrument procedures or when developing new instrument procedures.

NOTE: Comply with EIAP program guidance contained in the Code of Federal Regulations (CFR), specifically, 32 CFR, Part 989**,** Environmental Impact Analysis Process.

2.5.7.1. 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.

2.5.7.2. 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 AICUZ.

2.6. Magnetic Variation (MV) Changes. FAA Order 8260.19, *Flight Procedures and Airspace*, Chapter 2, Section 5, shall be used when applying MV values. MAJCOMs shall coordinate with FAA AVN-160 to obtain MV of record to be applied to new, relocated, and existing NAVAIDs/airports. Once obtained, it is the responsibility of the MAJCOM to provide the National Flight Data Center (NFDC), Airports, Facilities and Communications Division, with any MV updates. MAJCOMs shall inform their supported units when revisions to instrument procedures are required due to a change to the MV of record.

NOTE: When host nation directives do not direct how MV changes are to be applied at US military installations overseas, apply the criteria in FAA Order 8260.19 criteria to the maximum extent possible.

2.7. Visual Flight Rules (VFR) Procedures. When a "flight procedure" has not been evaluated to ensure compliance with TERPS criteria and all that goes with it (flight inspection, etc.), it cannot be flown in Instrument Meteorological Conditions (IMC), and is limited to use under basic VFR weather minimums as stipulated in the Code of Federal Regulations (CFR), Title 14, Part 91, Sub-part 91.155.

2.7.1. These procedures may be published in local flying directives and/or in a loose-leaf format; they shall not be published in the DoD or NACO FLIP.

2.7.2. Ensure the caveats "FOR USE UNDER BASIC VFR WEATHER MINIMUMS ONLY" and "PILOT IS RESPONSIBLE FOR TERRAIN/OBSTACLE AVOIDANCE" are included in both the planview of graphically depicted instrument procedures and in each VFR procedure published in textual format.

2.7.3. Procedure identification.

2.7.3.1. Naming can be accomplished IAW TERPS naming conventions as long as the procedure is identified as "NOT FOR USE IN IMC."

2.7.3.2. 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)".

2.7.4. Replace the entire minima line (MDA, HAT/HAA, DA/DH, ceiling and visibility) with "VFR".

2.7.5. Procedures published IAW this paragraph do not require formal review and processing, flight inspection, or waiver action for deviations to TERPS criteria.

2.8. FAA Forms and Publications.

2.8.1. When unable to download FAA forms referenced throughout this instruction from FAA websites, they may be requested from the FAA forms officer via commercial facsimile number (202) 267-5407. The FAA forms officer will submit your request to the appropriate FAA program office. The program office will either fax a hard copy or email an electronic copy of the requested form to you. Ensure your request to the FAA forms officer includes your email address and facsimile number.

2.8.2. FAA publications referenced in AFMAN 11-226(I) and this instruction are approved for USAF use as stated. Example, AFMAN 11-226(I), Volume 1, Chapter 2, Section 9, refers you to FAA Order 7130.3 for holding criteria. This instruction (AFI 11-230) makes reference to FAA Order 8260.19 for instructions on filling out FAA Form 8260-2, ***Radio Fix and Holding Data Record***. The first example allows you to apply all applicable criteria within the publication as stated, where the second example allows you to apply only a portion of the FAA publication.

2.8.3. **Attachment 1**, *Glossary of References, Abbreviations, Acronyms, and Terms*, is provided for the TERPS specialist for two purposes. The first is to establish a requirement for the TERPS specialist to maintain certain publications necessary in the performance of his/her duties. The second purpose is to provide a list of reference publications that could assist TERPS specialists in the performance of his/her duties.

NOTE: **Attachment 1** is ***not*** to be considered a list of approved FAA publications. Certain portions of these publications may be approved for USAF use and will be identified as such in USAF publications.

2.8.4. FAA General Policy Letters, formerly TERPS Instruction Letters (TILS). General Policy Letters are internal documents for FAA use only. HQ AFFSA/XOI reviews them for applicability to the USAF TERPS mission. Pertinent guidance and/or criteria changes in FAA General Policy Letters shall not be applied by USAF TERPS functions unless directed by HQ AFFSA/XOI.

2.8.5. FAA Form 8240-22, Facility Data (see paragraph **2.8.1.** for instructions on obtaining this form). Use whole number values when documenting the magnetic variation of record on this form.

2.8.5.1. For USAF owned/operated NAVAIDs, complete and maintain FAA Form 8240-22 for each NAVAID and VGSI at the airport.

2.8.5.2. Complete FAA Form 8240-22 IAW FAA Order 8240.36, *Instructions for Flight Inspection Reporting, Appendix 22*.

NOTE: Only source documentation (survey data, engineering maps, etc.) shall be utilized as source for applicable blocks of the form. Previous Facility Data Sheets shall not be considered as "source" material. Maintain source documentation with the applicable Facility Data sheet.

2.8.5.3. Unit TERPS shall forward the completed FAA Form 8240-22 to their parent MAJCOM for review and approval. MAJCOMs shall forward the FAA Form 8240-22 to AVN-210 (Flight Inspection Technical Support Branch) for processing. AVN-210 must process new or modified NAVAID information prior to the flight inspection of the facility.

2.8.5.4. When changes are made to a military facility, USAF Base Operations is responsible for non-procedural changes required in DoD FLIPs, e.g., Enroute Supplement, airport diagrams, etc.

NOTE: Additionally, the MAJCOM shall forward all approved FAA Form 8240-22'S associated with facilities in CONUS and Alaska to the AFFSA XOIA mailbox at mailto:affsa.xoia@andrews.af.mil. AFFSA XOIA will attach the approved forms to the Flight Information List (FIL) and send them to the

National Flight Data Center (NFDC). Appropriate data will be extracted by NACO and added to the Airport Facility Directory (A/FD).

2.8.6. Evaluating New Construction and Alterations to Current Obstructions. Title 14 of the Code of Federal Regulations (CFR), Part 77, requires that notification be provided to the FAA on proposed construction or alteration of structures that might present a hazard to flight. Copies of OE case studies and FAA determinations may be obtained from the FAA website (**http://oeaaa.faa.gov**).

2.8.6.1. FAA Form 7460-1, Notice of Proposed Construction or Alteration, is the form that documents the proposal.

2.8.6.2. The appropriate FAA region has the responsibility to process all FAA Forms 7460-1 in accordance with CFR Part 77 and FAA Order 7400.2, Procedures for Handling Airspace Matters. The FAA Region Air Force Representative (AFREP) will forward the OE/AAA Letter, Part 77 results, and obstacle accuracy code information to the affected military installation for evaluation and recommendations by the TERPS function.

2.8.6.3. When reviewing the information, the TERPS Specialist will evaluate the proposal for impact to the following:

2.8.6.3.1. Terminal Area IFR Operations. Evaluate the effect upon terminal area IFR operations; e.g., transitions, radar vectoring (MVAC), Minimum IFR altitudes, holding, STARs, and Departure Procedures.

2.8.6.3.2. Instrument Approach/Departure Procedures. Evaluate the effect upon any segment of an Instrument Approach Procedure (IAP). Also evaluate the effect upon any proposed IAP or any departure restriction.

2.8.6.4. Adjustments to Instrument Flight Procedures. Do not disregard proposed construction that impacts TERPS procedures (including MVA, MIFRAC, etc.) regardless of the severity of the impact or whether adjustment to the procedure is feasible. The TERPS Specialist shall not amend any instrument procedure until receipt of the FAA Form 7460-2, Notice of Actual Construction or Alteration, or other notification relative to an obstacle that will have an effect on current or proposed operations/procedures. Whenever it becomes obvious that the existence of a previously unknown obstacle requires procedure minima to be raised for safety reasons, expedite accomplishment of the change by means of a NOTAM.

2.8.6.5. Impact Notification and Recommending Solutions. When the proposed construction or alteration will have any impact on IFR aircraft operations, procedures, or minimum IFR altitudes, the response back to the FAA Region AFREP should clearly state the extent of the impacts and if possible, provide an acceptable solution. For example; "If the proposed antenna is reduced by XX feet, there would be no adverse impact to instrument procedures". Do not consider adjustments to instrument procedures as an acceptable solution. Any adverse impact to operations and/or instrument procedures should also be brought to the attention of Wing flying officials (DO, Stan Eval, etc.). Maintain a file copy of all proposals. The rationale for this filing is that construction could be delayed for various reasons and the same proposal may resurface one or two years later.

2.8.6.6. Obstacles of Variable Height or Location. An obstacle 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. Procedures for control of these types of obstacles must be outlined in a Local Operating Procedure.

2.8.6.7. Obstruction Evaluation (OE) and Airport/Airspace Analysis (AAA). Policy and procedure responsibility for the USAF OE/AAA Program is located within HQ USAF XOO-CA. The OE/AAA sys-

tem is designed to identify impact to operations at military airfields and heliports. The OE/AAA automation program incorporates a Military Part 77 surface evaluation, military VFR traffic pattern, circle searches, distance, calculation, and datum conversion capabilities.

2.8.6.7.1. OE/AAA Program Manager Responsibilities. The program manager is responsible for providing policy and guidance to Regional AFREP OE/AAA specialists and to ensure these personnel are trained on the functionality of the OE/AAA web-based system. The program manager interfaces with other DoD service OE/AAA Program Managers, the FAA Program Manager, AFFSA, and AFCESA as changes to policy occur and ensures these changes are disseminated to the AFREP OE/AAA specialists. Because numerous changes and modifications are on-going to the OE/AAA web-based system, the program manager will test the system to ensure accuracy and work with program specialists to correct errors.

2.8.6.7.2. Regional AFREP OE/AAA Specialist Responsibilities. The Regional AFREP OE/AAA specialist is responsible for ensuring the OE/AAA program is executed at least three days per week to meet the FAA 30 day response requirement to the proponent. Each AFREP OE office will make every effort to forward case studies to the responsible TERPS agency with enough lead-time to allow a full 10 working day review/response period. When this is not possible, the AFREP OE office must notify the responsible TERPS agency and provide a reasonable alternative suspense; an actual date is preferred over ‘ASAP’, ‘Immediately’, or ‘Rush’.

2.8.6.7.2.1. Information on structures identified as having the potential to impact airfield operations shall be distributed directly to the TERPS point of contact via the system generated airfield letter for further evaluation. Part 77 evaluation results and obstacle accuracy code information shall also be provided.

2.8.6.7.2.2. When 10 working days have elapsed and no response has been received from the appropriate TERPS agency and/or an extension has not been requested/approved, the responsible AFREP OE office will forward the case study to the next higher level TERPS authority (MAJCOM TERPS when the OE was originally forwarded to a unit TERPS office, or to AFFSA/XOIP when the OE was originally forwarded to a MAJCOM TERPS office) for immediate resolution or comment.

2.8.6.7.3. FAA Air Traffic Division OE Technicians/Specialists Responsibilities. The FAA Air Traffic personnel are responsible for ensuring the information submitted on the Notice of Proposed Construction, FAA Form 7460-1, and/or the on-line submission is verified correct and entered into the OE/AAA system for further coordination/evaluation by the AFREP offices. In accordance with CFR Part 77, paragraph 77.19, FAA OE Specialists have 30 days to respond to the proponent unless circumstances warrant further study.

2.8.6.7.4. FAA Airports Division/Airports District Office Specialist Responsibilities. The FAA Airports personnel are responsible for ensuring the information submitted on the Notice of Landing Area Proposals, FAA Form 7480-1, is verified correct and entered into the OE/AAA system for further coordination/evaluation by the AFREP offices.

2.8.6.7.5. Air Force Flight Standards Agency Responsibilities. Any changes pertaining to the OE/AAA Program shall be coordinated with the Air Force OE/AAA Program Manager. These changes include programming issues relating to the OE/AAA Program due to requirements in conjunction with GPD or administrative changes to enhance the protection of military airfields.

2.8.6.7.6. USAF TERPS Function Responsibilities. MAJCOM/Unit TERPS personnel are responsible for evaluating effects of proposed construction/alteration to instrument procedures in accordance with FAA Order 7400.2 and applicable USAF directives. Results of the evaluation shall be forwarded to the AFREP

office within ten working days of receipt to facilitate compliance with FAA response requirements to the proponent.

2.8.6.7.6.1. When the responsible TERPS agency (MAJCOM or unit TERPS function) has higher priority duties that prevent completing the evaluation and forwarding the results within 10 working days, they must contact the applicable AFREP OE office and request an extension prior to the suspense date.

2.8.6.7.6.2. When the TERPS agency cannot meet a short suspense, they may either request an extension from the Regional AFREP OE/AAA Specialist or contact the next higher level TERPS authority for assistance.

2.8.6.7.6.3. When the evaluation reveals operational impact to terminal area IFR operations or to instrument procedures, document all aspects of the impact in detail and provide alternatives such as lowering or relocating the structure.

2.8.6.7.6.4. When the case study is evaluated by other than the affected TERPS agency (see paragraph **2.8.6.7.2.2.**), the MAJCOM TERPS office or AFFSA/XOIP, as applicable, will evaluate the case study and provide comments to the AFREP OE office with a courtesy copy to the affected TERPS agency.

2.8.6.7.6.5. Units shall notify their MAJCOM when changes occur in OE contact information (i.e. POC, phone number, office symbol, e-mail address, etc.). MAJCOMs shall coordinate any changes in the distribution of OE cases with AFFSA XOI, who will intern coordinate the changes with HQ USAF XOO-CA.

2.9. Special Aircrew Training. Certain instrument procedures will require one of the following notes to be published on the approach plate: "Special Aircrew Certification Required" or "Special Aircrew and Aircraft Certification Required." This applies to CAT II/III ILS procedures, and as required in FAA directives on some Foreign Terminal Instrument Procedures. Unique procedures that ***do not*** fall into one of the two areas listed above but require one of the caveats listed, shall not be published in the DoD FLIP (i.e., a unique instrument procedure has been developed requiring "special aircrew training" and is not a CAT II/III ILS procedure) is a special use procedure (paragraph **5.8.** applies) and will be controlled by the developing unit/MAJCOM and published ‘loose-leaf’ only.

NOTE: Except for CAT II/III procedures (these requirements are already covered in AF and MAJCOM flying directives), the unit/MAJCOM responsible for the procedure will be the point of contact for addressing these special training/aircraft requirements and a method to contact the unit/MAJCOM will be annotated on the procedure.

2.10. Climb Gradients (CG). IAW AFI 11-202, Vol. 3 and AFMAN 11-217, Vol. 1, the standard climb gradient for departures and missed approaches is 200 ft/NM. When a higher rate of climb is required for obstacle avoidance and/or to meet Air Traffic Control (ATC) restrictions, the climb rate required shall be specified on the procedure IAW IACC and NGA/DoD product specifications. A climb gradient that exceeds 200 ft/NM for a missed approach procedure requires a waiver.

NOTE: A climb gradient that exceeds 200 ft/NM for a departure procedure does not require a waiver, however, the TERPS specialist and reviewing authorities should assess whether the climb gradient is sensible and attainable based on the various types of aircraft subject to using the departure procedure.

2.10.1. A ‘climb-to’ altitude shall be specified where the standard climb rate can be resumed when a climb gradient (obstacle and/or ATC) is published.

2.10.2. When a climb gradient is required to avoid obstacles, it shall be identified as a “Minimum Climb Rate.”

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

2.10.4. An ATC climb gradient shall not be published in lieu of an obstacle driven climb gradient that is also required.

2.10.4.1. There may be occasions when there is a necessity to publish an ATC Climb Rate in conjunction with an obstacle driven climb rate.

2.10.4.2. The ATC climb rate may be negated by ATC and will always be greater than an obstacle driven climb rate.

2.10.5. Missed Approach Climb Gradients.

2.10.5.1. Calculate missed approach climb gradients in the CONUS, Alaska, and Hawaii using the applicable (precision or non-precision) criteria in **Attachment 4**, paragraph **A4.10.1.** and paragraph **A4.10.2.**. When an operational advantage (lower climb gradient) can be achieved and is desired for locations in the CONUS, Alaska, and Hawaii, use the relevant (precision or non-precision) criteria outlined in **Attachment 4**, paragraph **A4.10.3.** for OCONUS locations to calculate this climb gradient. When the option in paragraph **A4.10.3.** is used for locations in the CONUS, Alaska, and Hawaii, add the note "NOT FOR CIVIL USE" and process the instrument procedure as nonstandard.

NOTE: When a nonstandard missed approach climb gradient is currently published due to obstacles or ATC, application of the relevant (precision or non-precision) criteria in **Attachment 4**, paragraph **A4.10.** may result in an increase to the current nonstandard climb gradient. When this is the case, a new waiver will be required for the higher climb gradient.

2.10.5.2. MAJCOM and unit level TERPS functions shall re-validate each missed approach climb gradient waiver as the current waiver expires.

2.10.6. Departure Climb Gradients.

2.10.6.1. Apply AFMAN 11-226(I), Vol. 4, paragraph 1.4.1 (Standard Formula) when calculating departure climb gradients in the CONUS, Alaska, and Hawaii.

2.10.6.2. When an operational advantage (lower climb gradient) can be achieved and is desired for locations in the CONUS, Alaska, and Hawaii, apply the DoD Option from AFMAN 11-226(I), Vol. 4, paragraph 1.4.1. When this option is used, add the note "NOT FOR CIVIL USE"; *waiver action is not required*.

2.10.6.3. The DoD Option shall also be applied to all departure procedures at OCONUS, including host nation locations and all OCONUS locations where the USAF exercises TERPS authority.

2.10.6.4. Round the result of either formula up to the next 10-foot increment and publish the rounded up value as the departure climb gradient.

Chapter 3

INSTRUMENT DEPARTURE PROCEDURES/RADAR DIVERSE VECTOR AREAS

3.1. General. Develop departure procedures (DPs) IAW AFMAN 11-226(I), *United States Standard for Terminal Instrument Procedures (TERPS)*, Volume 4, *Departure Procedure Construction,* and FAA Order 8260.46, *Departure Procedure (DP) Program.* Use the USAF Global Procedure Designer (GPD), when developing diverse departures. Follow the workflow process outlined in the GPD Operations Manual Volume 4, paragraph 1.2, to ensure the correct assessment of diverse departures/ODPs. When required,

develop departure routes (either SID or ODP) manually and document on AF IMT 3634 (see paragraph **3.4.**).

NOTE 1: When USAF is the IFR controlling facility for satellite airports where another agency is responsible for instrument procedure development and a DVA is required (see paragraph **3.3.14.**), obtain diverse departure assessment results from that agency.

NOTE 2: The next release of GPD will have the capability to develop departure routes (to include SIDS, RNAV SIDS, ODP routes) and VCOAs.

3.1.1. DPs developed to portray specific departure routes required by Air Traffic Control (ATC) and operational agencies are referred to as 'Standard Instrument Departures' (SIDs).

3.1.2. DPs developed to assist pilots in avoiding obstacles are referred to as 'Obstacle Departure Procedures' (ODPs).

3.1.3. Do not develop an ESA or MSA for a departure procedure.

3.1.4. Do not consider DPs with an ATC or obstacle driven climb gradient as 'nonstandard'; i.e., do not pursue waiver action for any DP that requires publication of a climb gradient.

3.2. RNAV Departure Procedures. Use FAA Order 8260.44, *Civil Utilization of Area Navigation (RNAV) Departure Procedures*, and other applicable FAA orders when developing RNAV departure procedures.

3.3. Departure Criteria. Use these criteria in conjunction with the specified paragraphs, as indicated, in AFMAN 11-226(I), Volume 4.

3.3.1. Diverse departure assessments and diverse ODPs will be documented in the departure procedure build output of GPD and published in a text or graphic format, depending on complexity. Complex ODPs that are obstacle driven shall be published as a graphic and shall be identified in the "IFR Take-Off Minimums and (Obstacle) Departure Procedures" portion of the FLIP.

3.3.1.1. When the procedure requires an obstacle avoidance climb gradient in excess of 200 ft/NM, a ceiling and visibility shall also be published for civil users.

3.3.1.2. Climb gradients, with an unrounded 'climb to' altitude of 200 feet above DER elevation or less, shall not be specified, however, the obstacles requiring such a climb gradient shall be identified in the IFR Take-Off Minimums and (Obstacle) Departure Procedures section and on the graphic.

3.3.2. All departure procedures are subject to flight inspection IAW AFMAN 11-225, Section 214 to include ODPs.

3.3.3. Publication of a SID does not eliminate the need to publish an ODP when a penetration to the diverse departure 40:1 OCS exists. The ('Delta T') symbol will be placed on all instrument approach and departure procedures when the diverse departure assessment results in 40:1 penetrations.

3.3.4. Radar vectors may be available to aircrews as a departure method; however, aircraft shall not be vectored below the Minimum Vectoring Altitude (MVA) on departure unless a Diverse Vector Area (DVA) has been evaluated and established (see paragraph **3.3.14.** and AFI 13-203, *Air Traffic Control,* regarding DVAs).

3.3.5. When the FAA or host nation is the IFR controlling facility for the airport, coordinate all departure procedures through the appropriate facility manager.

3.3.6. Minimum and ATC climb rates shall be published as vertical velocity tables.

3.3.6.1. Supported units shall forward diverse departure documentation, the departure procedure package (when required), and all associated drawings to the parent MAJCOM TERPS office for review and approval.

3.3.6.2. When applying departure sector criteria in AFMAN 11-226(I), Volume 4, Chapter 2, Paragraph 2.2, climb gradients in excess of 200 ft/NM are not authorized.

3.3.7. Paragraph 1.3.1; Low, Close-in OCS Penetrations. A ceiling and visibility shall not be published to see and avoid close-in obstructions for DPs published solely for military use.

NOTE: Raising the OIS origin height does not mitigate the requirement for low, close-in obstacle notes.

3.3.7.1. When publishing DPs in the DoD FLIP, annotate the location of close-in obstacles on both graphic DPs and on textual DPs. See FAA Order 8260.46, Appendix 5, block (4), item 2 for guidance and sample notes.

3.3.7.2. Taxiing and/or parked aircraft are to be considered as obstructions when evaluating the departure obstacle clearance surface (OCS). When it is possible for taxiing/parked aircraft to penetrate the departure OCS, these potential obstacles shall be depicted as if they were fixed obstacles on the DP IAW paragraph **3.3.7.1.**.

3.3.7.3. When an obstacle requires a climb gradient in excess of 200 ft/NM to a 'climb to' altitude greater than 200 feet above the DER elevation, you may attempt to reduce or eliminate the CG by specifying a minimum crossing height (screen height) above the DER elevation (see paragraph **3.4.10.**).

3.3.7.3.1. Use this height as the 40:1 OCS origin height when calculating the climb gradient.

3.3.7.3.2. When this option is used to mitigate a penetration to the 40:1 OCS and a climb gradient is not published, identify graphically the description, height, and location of the obstacle in relation to the DER that would have caused the climb gradient IAW paragraph **3.3.7.1.** had this option not been used.

3.3.8. Paragraph 1.4.1; Calculating Climb Gradients to Clear Obstacles.

3.3.8.1. At CONUS, Alaskan, and Hawaiian USAF locations, use the Standard Formula from AFMAN 11-226(I), Volume 4, Chapter 1, to determine the departure CG. When an operational advantage can be achieved, use the DoD Option formula from the same reference.

3.3.8.1.1. When the DoD Option formula is used, publish the note "NOT FOR CIVIL USE" on the plan-view of the graphic or in the IFR Take-Off Minimums and (Obstacle) Departure Procedures section of the FLIP.

NOTE: GPD does not have the ability to calculate climb gradients/climb to altitudes IAW the DoD option for diverse departures. Develop the procedure using GPD to determine the penetrating obstacles, and then manually calculate the climb gradient required for the controlling 40:1 penetrations. Document all manual calculations and include them in the procedure package.

3.3.8.1.2. Annotate in the remarks of the electronic procedure that the DoD option is being applied. Include all manual calculations (clearly indicating which option is being applied) in the SID/route procedure package.

3.3.8.2. At host nation locations and all USAF OCONUS locations where the USAF 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. Manually calculate the CG and document as described

in paragraph **3.3.8.**. The DoD option is not applicable for procedures designed/published/reviewed IAW USAF International criteria (see **Attachment 9**).

NOTE: The result of either formula establishes the baseline climb gradient used to compute vertical velocity.

3.3.8.3. Minimum or ATC climb gradients (expressed as 'ft/NM') shall be converted to a 'feet per minute' value prior to publishing as a vertical velocity value as follows.

3.3.8.3.1. Calculate the V/V for each 60-knot ground speed increment by multiplying the climb gradient by the appropriate ground speed and then dividing by 60. The resulting value will be rounded up to the next 10-foot increment for each ground speed increment and then published as a V/V.

3.3.8.3.2. Example: the V/V for 60 knots based on a computed climb gradient of 253 ft/NM would simply be rounded up to 260. The V/V for 120 knots based on the same climb gradient (253 ft/NM) would be '510' (253 x 120 = 30360. 30360 / 60 = 506. Round 506 up to 510). Based on this example, the V/V for 180 knots would be '760'; the V/V for 240 knots would be '1020', etc.

3.3.9. Paragraph 1.4.2, Calculating the CG Termination Altitude. When calculating the 'climb to' altitude (the point where the CG is no longer necessary), use the un-rounded CG from either of the formulas from Paragraph 1.4.1, Calculating Climb Gradients to Clear Obstacles. Publish 'climb to' altitudes in 100-foot increments. When the un-rounded value falls between two 100-foot increments, the published value shall be rounded up to the higher 100-foot increment. Show all manual climb to altitude calculations and include in package documentation.

NOTE: When the controlling obstacle is in the secondary area, calculate the 'equivalent height' value of the controlling obstacle by reducing its actual MSL value by the amount of rise in the secondary area from the edge of the primary area to the obstacle. Calculate the CG and 'climb to' altitude as if the obstacle was located in the primary area.

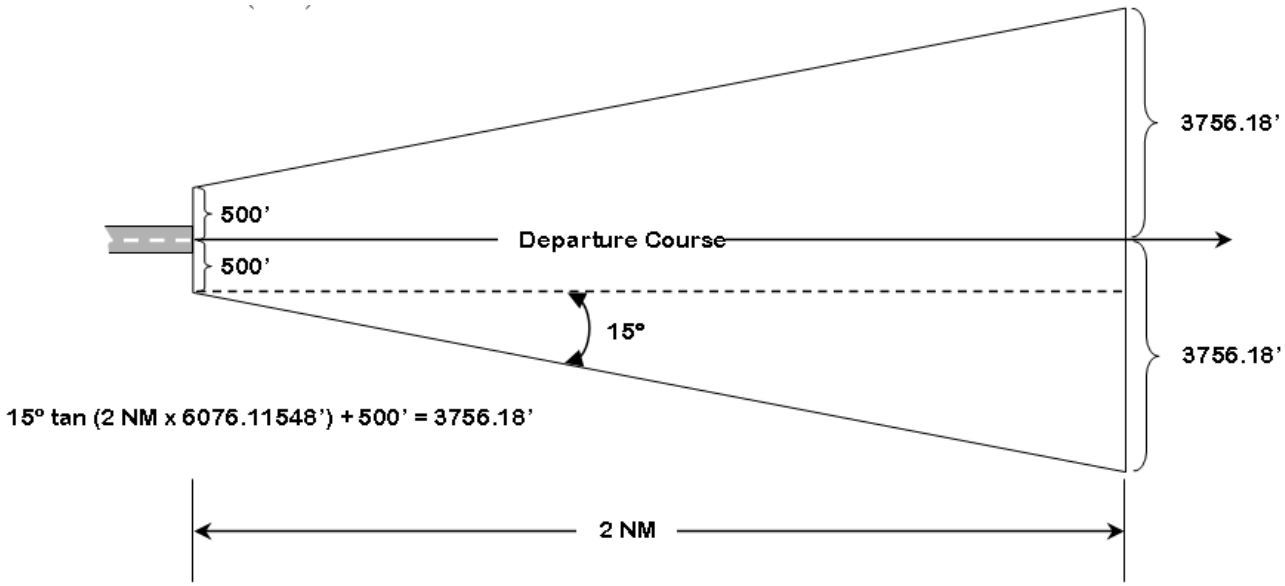
3.3.10. Paragraph 1.4.3, Climb Gradients to Altitudes for Other than Obstacles, i.e., ATC. The distance used to calculate the ATC climb gradient to an altitude is measured in the same manner as for obstacles.

3.3.11. Paragraph 1.4.4, Multiple Climb Gradients Application. Paragraph 1.4.4 applies to obstacle driven climb gradients only. When a departure utilizes multiple transitions, evaluate each transition separately and publish the climb gradient from DER to the obstacle requiring the highest climb gradient for that transition. When it is determined that a common climb rate can be applied to multiple transitions, publish a single climb rate for all applicable transitions.

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.

3.3.12. Paragraph 1.6.2; Area (also applies to Vol. 4, paragraph 3.1). The area splays from the 500-foot point, perpendicular to the centerline at DER. See **Figure 3.1.**.

Figure 3.1. Initial Climb Area (ICA) Construction



3.3.13. Paragraph 1.6.2.a; Length. Ensure the Initial Climb Area (ICA) is long enough for an aircraft to reach 400 feet above airport elevation.

3.3.13.1. When a climb gradient in excess of 200 ft/NM is used to reduce the length of the ICA to less than 2 NM, calculate the ICA length using the following formula:

$$\frac{c + (A-o)}{CG} = \text{Length of ICA in NM}$$

= Length of ICA in NM

c = initial "climb to" altitude (normally 400')

A = Airport elevation

o = DER elevation + DER crossing restriction

3.3.13.2. When an initial climb to an altitude less than 400 feet above the airport elevation is used to reduce the length of the ICA to less than 2NM, the departure is nonstandard and requires waiver processing. The note "NOT FOR CIVIL USE" shall be published when this option is used.

3.3.14. Paragraph 2.3; DVA Evaluation (ASR Required). A Diverse Vector Area (DVA) is required if an aircraft executing departure/climb-out instructions will be vectored below the Minimum Vectoring Altitude (MVA) or Minimum IFR Altitude (MIA). Where the IFR controlling agency is the FAA/Host Nation, the responsibility for determining the need and/or development of a DVA, lies with that agency (see paragraph **3.3.4.**). At locations where the USAF is responsible for vectoring departing aircraft (including from

satellite airports) and when requested by the Radar Facility manager, develop DVA information as follows:

3.3.14.1. Perform a diverse departure obstacle assessment IAW AFMAN 11-226(I), Volume 4, Chapter 2. When this assessment reveals no penetrations to the 40:1 OCS, inform the Radar Facility manager that aircraft on departure may be vectored below the MVA/MIA provided the aircraft's climb to an altitude at or above the MVA/MIA is not interrupted.

3.3.14.2. When penetrations to the OCS are encountered, take one or more of the following actions to avoid these obstacles;

3.3.14.2.1. Establish sectors,

3.3.14.2.2. Isolate the penetrating obstacle(s),

3.3.14.2.3. Determine a DER crossing height (not to exceed 35 feet above DER elevation), and/or

3.3.14.2.4. Develop a climb gradient (CG).

NOTE 1: Obstructions encountered that would require a CG in excess of 200 ft/NM to an altitude of 200 feet or less above the DER elevation should already be identified in the "IFR Take-Off Minimums and (Obstacle) Departure Procedures" section of FLIP. Aircrews receiving radar vectors should therefore be aware of these obstructions and take appropriate action to avoid them.

NOTE 2: A minimum crossing height over the DER may be specified to raise the 40:1 OCS origin height to reduce or eliminate the need for a CG.

3.3.14.3. Sectorize the DVA IAW AFMAN 11-226(I), Volume 4, paragraph 2.2, or isolate the obstacle(s) causing the penetrations with buffered areas IAW AFMAN 11-226(I), Volume 4, Figure 2-9. When isolating obstacles, the boundary of the buffered area shall be established 3 NM (5 NM when the obstruction is greater than 40 NM from the radar antenna) from the penetrating obstacle(s).

NOTE: At locations using the DVA obstacle isolation option when operating with a Center Radar Presentation (CENRAP), apply a 5 NM buffer area around all penetrating obstacles throughout the entire DVA.

3.3.14.4. DVA sectors and buffered areas shall be depicted on a radar video map.

3.3.14.5. Areas outside of established sectors and buffered areas within the DVA are known as "free vector areas".

3.3.14.6. An instrument procedure package is required for DVA documentation. The entire DVA (including all established sectors and any buffered areas) shall be depicted on a suitably scaled map with topographical features and maintained with other TERPS files.

NOTE 1: Provide the facility manager all required restrictions (DER crossing height) and all other information so that the DVA can be designed to eliminate vectoring through multiple sectors that require different climb gradients. Include the dimensions of the entire DVA; describe each DVA sector and/or buffered area, and any required CG. This information will also be used by the facility manager to adequately describe the DVA to ATC in a facility operating instruction.

3.3.14.7. When the MSL height of the isolated obstruction plus the appropriate Required Obstacle Clearance (ROC) height above the associated buffer area is below the MVA/MIA, the altitude (rounded to the next higher 100-foot increment) required to clear this obstacle must also be specified in the DVA guidance so that ATC will have the option of vectoring departing aircraft over the obstacle.

3.3.14.8. Turns below 400 ft above the airport elevation shall not be authorized for DVAs.

NOTE: This note pertains to DVA development when vectoring aircraft below the MVA or MIA that are departing FAA-owned satellite airports. When the USAF is the IFR controlling facility, contact the appropriate FAA procedure specialist for the results of the diverse departure assessment, to include the location, description, and elevation of all OCS penetrations. Use this information to develop the DVA per this AFI. The existence of a diverse departure assessment or publication of the Delta T symbol (T) by the FAA does not relieve the USAF of the responsibility for developing an appropriate DVA.

3.3.15. Paragraph 3.1; Dead Reckoning (DR) Departure. When operational necessity dictates, DR segments may extend more than 10 NM from DER. When applying this option, the DP is nonstandard and waiver processing IAW paragraph **5.5.** is required.

3.3.15.1. 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 departure.

3.3.15.2. Publish DR tracks, not headings, to be flown, for example, "Climb on Track XXX," not "Climb on Runway Heading".

3.3.16. Paragraph 3.3; Localizer Guidance. When PCG is provided by a localizer, the note "CAUTION: Back course procedures apply" shall be published on the planview.

3.3.17. Paragraph 3.5, Turning Segment Construction; 3.5.1, General. The minimum airspeed allowed for Category E aircraft shall be 310 KIAS.

Table 3.1.

DELETED.

3.4. AF IMT 3634, *Departure Procedure (DP)*. Use this IMT to coordinate agency approval and publish SIDs and Route DPs.

3.4.1. Item 1. **Departure.** Enter the departure name and number, as you want it to appear on published data. Name departures according to FAA Order 8260.46, Appendix 2. For FTIP departures, enter the identification verbatim, as published by the host nation.

3.4.2. Item 2. **Aerodrome/Airport Name.** Enter the name of the airport. Also include the four-letter or alphanumeric ICAO designator.

3.4.3. Item 3. **Departure Computer Code.** Coordinate with servicing FAA ARTCC on assignment and effective date of departure computer codes IAW FAA Order 8260.46.

3.4.4. Item 5A. **Type of Departure**. Indicate whether the Departure Procedure (DP) was developed to meet an Air Traffic Control requirement or for the purpose of obstacle avoidance. Also indicate if the procedure is to be published as a high, low, or both.

3.4.5. Item 5B. **Publish.** Indicate which product, FLIP or NGA Loose-leaf, is required. When a NGA loose-leaf is required, attach a distribution list and/or state whether or not a negative is required. Additionally, indicate how NGA is to publish; either as a graphic or in a text format. Refer to FAA Order 8260.46, *Departure Procedure (DP) Program,* for guidance on making this determination.

3.4.6. Item 6. **Effective Date.** Enter requested date based on operational requirements and integration into ARTCC computer system. The final review authority enters the actual effective date after coordination

with all concerned agencies. Indicate if procedure is original or amended. If an amendment, type the amendment number in the block provided below the effective date.

3.4.7. Item 7. **Planview.**

3.4.7.1. Depict the airfield and prepare a graphic illustration of the complete departure routing. The chart shall encompass the area required to effectively show the departure routing, including transitions to the appropriate en route structure. This chart may be included as an attachment to the procedure package.

3.4.7.2. Only one procedure shall be shown on the form; it may have multiple transitions. Portray take-off routes from more than one runway or from opposite ends of the same runway as one procedure.

3.4.7.3. All routes, turns, altitudes, radio aids to navigation, facilities forming intersections and fixes, and those facilities terminating the departure procedure (where the procedure joins the altitude structure for which the departure was established), shall be shown in graphic illustration. Enter geographical coordinates to the nearest hundredth of a second, of each fix used in RNAV procedures. For each transition, include the name of the chart (L-1, H-5, etc.) that shows the enroute facility. Show the mileage and courses, radials, or bearings between runway(s) and facilities or fixes along the route of flight.

3.4.7.4. Normally, the depiction is centered either on the airport runways or primary NAVAID. Depictions may be offset in order to better utilize the plan view area to enhance readability. All drawings shall be oriented to true north.

3.4.7.5. In addition to the above data, include:

3.4.7.5.1. Radio Frequencies. Indicate one primary VHF and one primary UHF frequency for the functions listed and any other agency, as required.

3.4.7.5.2. Special Use Airspace (SUA). SUA shall be shown only when considered critical to the procedures as designated by requesting agency.

3.4.7.5.3. Obstacles.

3.4.7.5.3.1. Segment controlling obstacles and other prominent obstacles that would create a hazard to safe navigation in the event departure procedures were not executed precisely shall be shown in their exact geographic location so as to be in true relationship to the departure procedure. When portrayal of several obstacles in a small area would tend to create clutter, only the highest of the group need be shown.

3.4.7.5.3.2. The mean sea level (MSL) elevation of the obstacle shall be shown to the nearest foot.

3.4.7.5.4. Minimum Climb Rate.

3.4.7.5.4.1. Obstacle DP. When required for obstacles, depict a minimum climb rate in the blocks provided to the right of the frequency listing. When the climb rate required for ATC purposes is *higher* than the climb rate required for obstacles, also depict it on the obstacle DP. Do not depict ATC climb rates that are lower than the minimum (obstacle) climb rate.

3.4.7.5.4.2. SID. ATC climb rates shall be depicted in the blocks provided to the right of the frequency listing.

NOTE: Departure climb rates required for obstacle avoidance or ATC purposes do not require waiver.

3.4.7.5.4.3. Minimum and ATC climb rates shall be shown in the table as vertical velocities (V/V) in feet per minute (fpm) in 60 knot increments. See paragraph **3.3.8.3.** for additional guidance.

3.4.7.5.4.4. Where multiple runway departures are required, show the V/V information for all runways involved by drawing more blocks to extend the columns vertically down the page.

3.4.7.5.4.5. An asterisk (*) will be used to footnote Minimum Climb Rates and the dagger symbol (†) will be used to footnote ATC Climb Rates.

3.4.7.5.4.6. When the climb rate is premised on an ATC requirement, the following note will be shown immediately below the V/V box: "ATC Climb Rate." Minimum or ATC climb rates must indicate the altitude and/or fix at which the climb gradient is no longer required.

3.4.7.5.5. Notes.

3.4.7.5.5.1. Operational notes shall be held to an absolute minimum and shall be based on mandatory user requirements.

3.4.7.5.5.2. Procedural data notes shall be published to be consistent with the safe execution of the procedure.

3.4.8. Item 8. **Departure Procedure Description.** A written description of the departure procedure, including all turns, altitudes, headings, distances, facilities/fixes, and all routes (indicate route number if an airway; indicate "direct" if otherwise) to the terminating facility/fix. Add the computer code for transitions, where applicable.

NOTE: When revising Item 7 or Item 8 of previously published DPs, attach a copy of the previous version with revisions clearly indicated.

3.4.9. Item 9. **Controlling Obstacles.**

3.4.9.1. **Takeoff Obstacles.** Identify obstacles located in the ICA that require the publication of nonstandard takeoff minimums and/or a climb gradient.

NOTE: See paragraph **3.3.8.** for guidance on how to calculate climb gradients for those obstacles that cause a CG in excess of 200 ft/NM to an altitude of 200 feet or more above the DER elevation.

3.4.9.2. **Departure Obstacles.** Identify obstacles outside the ICA but within subsequent departure trapezoids that require the publication of nonstandard takeoff minimums and/or a climb gradient. In some cases where specific departure routing is required, obstacles dictating procedure design may be outside the trapezoids but shall be depicted on the DP for aircrew awareness and listed here as a departure obstacle.

3.4.10. Item 10. **Adjustment for Close-In Obstacles.** When an adjustment is required, enter the minimum height (AGL), in feet, for the aircraft to be over the departure end of runway (DER). This height shall not exceed 35 feet. Also publish this value in a note on the planview as follows: "Cross DER at least 20 feet AGL/187 MSL" or "Cross DER at least 5 feet AGL/3685 MSL due to barrier equipment".

3.4.11. Item 11. **If an Obstacle Climb Gradient is Published, List Take-Off Minima.** List the take-off minima for the benefit of applicable civil users. When the DP is noted "NOT FOR CIVIL USE", enter "N/A" once at the top of each column.

3.4.12. Item 12. **Are Expanded Service Volume Checks Required?** When a DP is developed that incorporates segments and/or fixes that reach beyond the standard service volumes listed in FAA Order 8260.19, an expanded service volume (ESV) check is required. Download, complete, and process FAA Form 6050-4 IAW paragraph **2.4.** of this AFI. Maintain approved ESVs with the DP.

3.4.13. Item 13. **Are Airspace Changes Required?** To afford separation from other aircraft, all departure procedures shall be contained in controlled airspace (see paragraph **A3.1.5.**). Related information may be found in AFI 13-201, FAA Order 7400.2, FAA Order 7400.9, and FAA Order 8260.46.

3.4.14. Item 15. **Are Waivers to Departure Criteria Required?** When applicable, check the yes box and list any waivers required for new or amended procedures. List the number of approved waivers on file for amended procedures and the approval date for each waiver. These waiver listings can be placed in Item 16, Remarks, or continued on bond paper as needed.

3.4.15. Item 16. **Remarks.** Enter other pertinent data necessary to publish an accurate departure.

NOTE: Ensure the other Item 16, Departure ID, at the top of page 3 is completed.

3.4.16. Item 17. **Approval Signatures.** All signature blocks shall be signed, as required. As a minimum, the "Procedure Specialist," "Air Traffic Operations Manager" (at locations where the USAF has development responsibility), "Senior Operational Commander," and "MAJCOM TERPS Branch" signatures shall be obtained. When the procedure's protected airspace overlaps into an adjacent facility's airspace, ensure coordination signatures are obtained from that facility. On nonstandard procedures, "MAJCOM (*WAIVER*)" block must be signed by the MAJCOM/DO or formally designated representative, as outlined in the appropriate MAJCOM supplement to AFI 11-230. Include an explanation when signatures cannot be obtained.

NOTE 1. All signature blocks shall include printed name, rank/grade, and office symbol.

NOTE 2. The "Senior Operational Commander" block for Foreign Terminal Instrument Procedures shall be signed by the MAJCOM/DO/CFACC/JFACC (or equivalent), or a formally designated representative. This will signify compliance with paragraph **1.4.3.**. At locations where the USAF has procedure development responsibility, the designated representative for the "Senior Operational Commander" is the primary Wing OG responsible for flight operations.

3.5. DELETED.

3.6. DELETED.

Chapter 4

INSTRUMENT APPROACH AND ARRIVAL CRITERIA

4.1. Standard Terminal Arrival (STAR). All STARs within the Continental US, Alaska, and Hawaii are developed and maintained by the FAA. When a requirement exists that can't be met by the FAA, develop STARs only when feeder routes and/or initial approach segments will not suffice. Use the criteria in AFMAN 11-226(I), Chapter 17, and the guidance in FAA Order 7100.9, *Standard Terminal Arrival,* when developing a STAR. Use FAA Form 7100-4, ***STAR-Standard Terminal Arrival,*** for documenting and processing the procedure. Instructions on filling out FAA Form 7100-4 can be found in FAA Order 7100.9.

NOTE: Host nation produced STARs shall be evaluated, documented, and processed IAW the applicable host nation FTIP acceptance category and guidance in **Chapter 7**.

4.2. Airborne Radar Approach (ARA) Criteria. Airborne Radar Approach procedures are special-use procedures (see paragraphs **5.8.** and **8.3.**) used only by aircraft with approved airborne radar systems. MAJCOM headquarters flying authorities review and approve these airborne radar systems for aircraft

assigned to them. At a minimum, develop an intermediate, final, and missed approach segment IAW AFMAN 11-226(I) as follows:

4.2.1. **Initial Approach Segment.** Apply AFMAN 11-226(I), Volume 1, paragraphs 230, 231, 232, and 235 except the angle of intersection between the initial and intermediate approach courses will not exceed 90 degrees. A satisfactory terminal area fix (AFMAN 11-226(I), Volume 1, Chapter 2, Section 8) may be used in addition to the ARA fix at the Initial Approach Fix (IAF) to facilitate use of enroute navigation systems up to the IAF.

4.2.2. **Intermediate Approach Segment.** When there is no initial segment, the intermediate fix altitude shall not be below the MVA at the intermediate fix location. Apply AFMAN 11-226(I), Volume 1, paragraphs 240, 241, and 242.

4.2.3. **Final Approach Segment.** Comply with AFMAN 11-226(I), Volume 1, paragraph 250, except:

4.2.3.1. **Alignment.** The final approach course will be aligned on the extended runway centerline.

4.2.3.2. **Area.** The area considered for obstacle clearance begins at the final approach fix, ends at the runway threshold, and is centered on the final approach course. Course length must provide adequate distance for an aircraft to make the required descent. Minimum length is 6 miles, and maximum length is 10 miles.

4.2.3.2.1. The primary area width is 1.7 miles on each side of the runway centerline at the approach end. It expands uniformly to a maximum 4-mile width on either side of the extended runway centerline (8 miles total) at a point 10 miles from the approach end of the runway.

4.2.3.2.2. AFMAN 11-226 (I), Volume 1, paragraph 1044b, Airport Surveillance Radar (ASR) criteria can be used in developing the final approach segment for aircraft equipped with APN-241 RADAR in lieu of the criteria stated in paragraph **4.2.3.2.1.**. Since the obstacle assessment areas are smaller, aircraft must be equipped with Dual Inertial Navigation System (INS), Integrated Global Positioning System (GPS), and Dual Radar Altimeters. When this criteria is used, the following note shall be published in the approach plate: "**FOR USE BY AIRCRAFT EQUIPPED WITH APN-241 AIRBORNE RADAR, DUAL INS, INTEGRATED GPS, AND DUAL RADAR ALTIMETERS.**"

NOTE 1: MAJCOM flying operations are required to determine whether or not specific airborne ground mapping equipment supports the ability to perform ARA procedures.

NOTE 2: Integrated GPS must meet the requirements established in AFI 11-202, Volume 3 and current AF/MAJCOM policy directives. The additional systems required are to supplement and enhance situational (position) awareness and compensate for the reduced obstacle assessment area widths.

4.2.3.2.3. The secondary area, which is on each side of the primary, is zero miles wide at the approach end of the runway. It expands uniformly to a maximum of l mile on each side of the primary area, at a point 10 miles from the approach end of the runway.

4.2.3.3. **Obstacle Clearance.** The minimum obstacle clearance in the primary area is 250 feet. In the secondary area, 250 feet of obstacle clearance must be provided at the inner edge, tapering uniformly to zero at the outer edge.

4.2.3.4. **Descent Gradient.** The optimum gradient is 318 feet per mile. The maximum is 400 feet per mile. When a step-down fix is used, the descent gradient applies between the Final Approach Fix (FAF) and the step-down fix and between the step-down fix and the runway threshold.

4.2.4. **Circling Approach.** Apply AFMAN 11-226(I), Volume 1, Chapter 2, Section 6.

4.2.5. **Missed Approach Segment.** Apply AFMAN 11-226(I), Volume 1, Chapter 2, Section 7. The missed approach point is on the final approach course at the point where the aircraft has reached a specific radar distance from the end of the runway. It must not be farther from the FAF than the first usable portion of the landing surface. Whenever possible, develop a missed approach that does not require airborne radar.

4.2.6. **Landing Minima.** Apply AFMAN 11-226(I), Volume 1, Chapter 3.

4.2.7. **ARA Reflectors.** Reflector requirements are determined by equipment specifications addressed in MAJCOM flying directives. When radar reflectors are placed on the airfield, their locations shall be depicted on the associated airport diagram.

4.2.8. **Satisfactory Fixes**. All fixes must be defined by use of the airborne radar system. The fix error used in the design of the procedure will be based on the type of airborne equipment to be used as follows:

4.2.8.1. A fix error displacement of plus or minus 500 feet may be used and the following note shall be published on the Approach Procedure: "PROCEDURE NOT AUTHORIZED FOR APN-59 EQUIPPED AIRCRAFT."

4.2.8.2. When a procedure must be designed to accommodate APN-59 equipped aircraft, a fix error displacement of plus or minus ¾ NM must be used.

4.2.8.3. Annotate all **named** turn points and fixes of an airborne radar pattern as waypoints (see paragraph **2.3.**). Process the appropriate FAA Form 8260-2. RNAV waypoints may be depicted for all segments but they **shall not** be used as a primary means of navigation.

NOTE: RNAV waypoints must be included on an ARA procedure to assist aircrews in maintaining situational awareness when airborne vectors become unreliable due to radar equipment malfunctions or other limitations (aircrew proficiency, airfield reflectivity, etc.).

4.3. Area Navigation (RNAV).

4.3.1. RNAV (ground-based systems, e.g. VOR/DME). Manually develop procedures using the criteria in AFMAN 11-226(I), Vol. 1, Chapter 15.

4.3.2. RNAV (satellite-based systems, e.g. GPS).

4.3.2.1. Non-precision (stand-alone LNAV IAW FAA Order 8260.38 and Terminal Arrival Areas (TAA) IAW FAA Order 8260.45). Use GPD to develop all supported procedure segments, to include final, intermediate, initial, holding, right/left base, straight-in, ESA, and MSA. Construct missed approaches manually. Include in the procedure package all drawings and manual computations.

4.3.2.2. The USAF takes exception to FAA Order 8260.38, paragraphs 11a and 12a. For USAF procedures, course changes at the Intermediate Waypoint (IWP) shall not exceed 90 degrees. Course changes at the Final Approach Waypoint (FAWP) shall not exceed 15 degrees.

4.3.2.3. Approach with Vertical Guidance (APV), LNAV/VNAV (including Baro-VNAV), and LPV. RESERVED.

4.3.2.4. RNAV departures. RESERVED.

4.4. Point in Space (PINS) Procedures. Procedures that do not provide for landing may be established with a Minimum Descent Altitude (MDA) or Decision Altitude (DA) of 500 feet or higher above ground

level (AGL). Except for helicopter point in space procedures, these are special-use procedures and require annotation per paragraph **5.8.**. Additionally, paragraph **2.7.**, Visual Flight Rules (VFR) Procedures, applies to PINS procedures.

4.5. Publishing ILS Restrictions. Permanent, flight inspected restrictions to ILS facilities, as documented in the flight inspection report, shall be published in the plan view of FLIP as a caution note(s). Inform all other signatories on the procedure of these restrictions. Examples: "CAUTION: ILS GS unusable below 300 MSL", or "CAUTION: Autopilot coupled operations NA past DA". Any new restrictions shall be processed as procedural changes.

4.6. Combining Procedures. The primary reason for combining instrument approach procedures is to facilitate pilot actions when flying multi-receiver aircraft. Procedures must first be developed as stand-alone procedures and then may be combined on a single chart provided all of the following:

4.6.1. Aircrew confusion or chart clutter does not result.

4.6.2. The differences in the published final approach courses span no more than 4 degrees of each other and only one track is depicted. Show no more than two final approach courses. Example: ILS 151°/TAC 154°.

4.6.3. Only one FAF/PFAF and altitude, step-down fix (most restrictive) and altitude, VDP, and non-precision missed approach point (MAP) is established.

4.6.4. Circling minima are common.

4.6.5. Missed approach procedures are common; except that the precision and non-precision missed approach points may differ. However, the procedures *may not be combined* if the missed approach evaluations produce different results (for example; the localizer missed approach surface has no penetrations but the ILS requires a climb gradient).

NOTE 1: Reference an ILS approach, a minimum of two separate builds, one for the ILS and one for the LOC, must be in the instrument procedure package. Segments common to both the ILS and the LOC (initial segment, ESA, MSA) need only be developed and documented once.

NOTE 2: RNAV (GPS) procedures shall not be combined with procedures using ground based NAVAIDs (e.g., VOR/DME, TACAN, ILS, etc.).

4.7. Displaced Threshold Procedures. Temporarily displacing or moving the threshold may have an adverse effect on instrument approach/departure procedures. TERPS personnel shall revise instrument procedures as necessary to ensure flight safety and as required to support continued flying operations. Only those procedures considered mission essential will be adjusted based on the following guidance:

4.7.1. For procedures developed using GPD, edit the runway information (using the Data Manager application) to indicate the amount of threshold displacement. A new, displaced threshold location is automatically calculated. Ensure that the runway landing length is also changed to reflect the shortened runway. In the runway supplementary data, indicate that the displacement is temporary. Ensure that the displaced threshold elevation and the new TDZE is also entered. If the highest portion of the aerodrome was at the non-displaced threshold, the airport elevation may also require update in the aerodrome properties. After saving and exiting Data Manager, run Auto Eval on all saved procedures to check for changes.

4.7.2. Analyze the Auto Eval results, and refresh all procedures that indicate changes and that are intended for continued use during the temporary threshold displacement. Note all violations, and correct if possible. Process all procedural changes per guidance in this instruction.

4.7.3. Note that precision operations may not be possible during temporary threshold displacements (N/A to associated non-precision procedures, i.e. localizer). When re-evaluation results in a GQS penetrations, lower than standard TCH/WCH, and/or an RPI at or prior to the displaced threshold location, existing precision procedures must be NOTAMed unusable.

4.7.4. When appropriate, add temporary obstacles for any equipment that will be located on or around the runway.

4.7.5. Visual glideslope indicator systems (VASI/PAPI/PLASI) may be unavailable for the same reason as the ILS (see paragraph **4.7.3.**).

NOTE: The intent of this paragraph is for those situations when the threshold will be temporarily displaced and operations will continue to the affected runway (i.e., normal runway operations will not be suspended by NOTAM).

4.8. Side-Step Maneuver (SSM) Procedures. A SSM is a procedure where the non-precision final approach is aligned to one runway (referred to as the approach runway), and a visual maneuver is made to land on an adjacent or parallel runway (referred to as the side-step runway). Do not apply SSM criteria to precision approach procedures. A SSM to an adjacent or parallel runway is authorized under the following conditions:

4.8.1. Runway centerlines are separated by 1200 feet or less.

4.8.2. Only one non-precision final approach course (to the approach runway) is published.

4.8.3. Approach runway final approach course shall meet straight-in alignment criteria and be aligned within 3 degrees of the approach runway centerline.

4.8.4. The procedure is identified according to AFMAN 11-226(I), Volume 1, paragraph 161.

4.8.5. Evaluate a non-precision final approach segment (appropriate to the final approach guidance) for both the approach and side-step runways.

4.8.5.1. The appropriate final approach area of the side-step runway must be aligned with runway centerline extended.

4.8.5.2. Establish the side-step runway ‘FAF’ on the final approach course abeam the approach runway FAF. The area considered for obstacle clearance in the side-step final starts at the side-step ‘FAF’ and continues towards the side-step runway threshold.

4.8.5.3. Evaluate a standard visual portion of final to both the approach and side-step runways. Do not establish a VDP for the side-step runway.

4.8.5.4. Determine the MDA for both final approach areas.

4.8.6. The same non-precision obstacle clearance used for the approach runway shall be used to determine the non-precision MDA for the side-step runway. The published side-step MDA shall be the higher of the MDAs determined for either the approach or side-step final approach areas.

4.8.7. Visibility Minima.

4.8.7.1. Publish visibility IAW AFMAN 11-226(I), Volume 1, Table 6, or Table 11, whichever is greater. Use the side-step height above touchdown (HAT) when calculating visibility values (side-step runway MDA minus side-step runway Touchdown Zone Elevation (TDZE) equals side-step runway HAT).

4.8.7.2. When the distance between the FAF and side-step runway threshold is less than the minimum no-lights visibility, a SSM for that approach category is not authorized.

NOTE: This is because the maneuver can only be conducted between the FAF and the MAP and sufficient visibility is necessary to acquire and maneuver to the side-step runway.

4.8.7.3. Published visibilities must not be less than the distance between the MAP and the side-step runway threshold measured from the plotted position of the MAP directly to the side-step runway threshold.

4.8.7.4. Credit for lights installed to the side-step runway may be applied according to AFMAN 11-226(I), Volume 1, Chapter 3, except read references to straight-in as side-step. The minimum visibility after applying credit for lights must be no less than 1 mile.

4.8.8. Apply criteria for descent gradients in AFMAN 11-226(I), Volume 1, paragraph 252, to the approach runway. Also apply paragraph 252 to the side-step runway except the gradient is based on:

4.8.8.1. The distance from the FAF or the last step-down fix to the side-step runway threshold.

4.8.8.2. The height difference between the minimum altitude at the FAF or the last step-down fix and the TDZE of the side-step runway.

4.8.9. Minima are published as shown in the sample below in **Figure 4.1.**. Assuming runways 27L and 27R, with a TACAN approach published to runway 27L, and the procedure would be identified as TACAN RWY 27L.

NOTE: When publishing circling minima, the Circling Minimum Descent Altitude (CMDA) in each category shall not be lower than the highest published non-precision side-step runway MDA.

Figure 4.1. Sample Side-Step Minima Publication.

CATEGORY	A	B	C	D
S-27L	**400/24** 390 (400-1/2)		**400/40** 390 (400-3/4)	
SIDESTEP RWY 27R	**500/24** 490 (500-1/2)		**500/40** 490 (500-3/4)	
CIRCLING	**500-1** 486 (500-1)		**500-1¾** 486 (500-1¾)	**580-2** 566 (600-2)

4.9. Airport Surveillance Radar (ASR) Approach Procedures. Apply AFMAN 11-226(I), Volume 1, paragraph 252 when determining the appropriate ASR approach descent gradient and FAF altitude. The TCH, descent angle, and gradient shall not be published for ASR approach procedures.

4.9.1. At Radar Final Control (RFC) locations without ASR scope availability, surveillance approaches using PAR azimuth may be developed using Localizer criteria (AFMAN 11-226(I), Volume 1, Chapter 9). This will permit use of USAF GPD for procedure development. Recommended altitudes must be computed manually.

4.9.1.1. The FAF is defined as a distance from the PAR touchdown point (RPI).

4.9.1.2. The segment length shall be measured from the FAF to the PAR touchdown point (RPI).

4.9.1.3. Recommended altitudes shall be figured for each mile on final, but not below the MDA.

4.9.1.4. Use the FAF to threshold distance and the TCH (MSL value) when calculating the recommended altitudes for straight-in approaches.

NOTE: Use the VGSI TCH for calculations. When there is no VGSI for the runway, select an appropriate TCH from AFMAN 11-226(I), Volume 3, Table 2-3.

4.9.1.5. Recommended Altitude Calculations. Recommended altitudes shall be rounded to the **nearest** 20-foot increment. Given the following conditions: FAF 7.8 miles from threshold; minimum altitude at FAF is 9000; minimum altitude at 3 mile fix is 7300; TCH Elevation (MSL) is 6172; and MDA is 6600, use the following to calculate the recommended altitudes.

Table 4.1. Sample Recommended Altitude Calculations.

9000 – 7300= 1700 divided by 4.8 = 354 ft/NM from FAF to step-down fix

(0.80 X 354 = 283 ft/NM FAF to 7 Miles)

7300 – 6172 divided by 3 = 376 ft/NM from step-down fix to threshold

NOTE: Since the gradient between the step-down fix and the threshold is greater than the gradient between the FAF and the step-down fix, the greater gradient must be continued out to the FAF and the minimum altitude at the FAF must be adjusted upward.

4.8 X 376 = 1804.8

7300 + 1804.8 = 9104.8 = ***9100*** *(Adjusted FAF altitude)*

(0.80 X 376 = 300 ft/NM FAF to 7 miles)

9100 – 300 = 8800 at 7 miles	**8800**
8800 – 376 = 8424 at 6 miles	**8420**
8424 – 376 = 8048 at 5 miles	**8040**
8048 – 376 = 7672 at 4 miles	**7680**
7672 – 376 = 7296 at 3 miles	**7300** (Step-down Fix)
7300 – 376 = 6924 at 2 miles	**6920**
6924 – 376 = 6548 at 1 mile	**Not Used (**Below MDA**)**

4.9.2. For point in space approaches, the recommended altitudes must also be calculated manually as described above, except use the FAF to MAP distance and the MDA.

4.10. DELETED.

4.11. Best Fit Straight Line (BFSL) Application to Threshold Crossing Height (TCH).

4.11.1. When the TCH has been determined by actual flight inspection IAW FAA Order 8240.47, *Determination of Instrument Landing Systems (ILS) Glidepath Angle, Reference Datum Heights (RDH), and Ground Point of Intercept (GPI),* enter the RDH value from the flight inspection report as supplementary ILS data.

4.11.2. ILS procedures that have a TCH determined by BFSL that is below 30 feet or above 60 feet shall be submitted for waiver approval. A copy of the Flight Check report shall be submitted with the waiver request. GPD will not automatically raise a violation or generate a waiver form.

4.11.3. Apply FAA Order 8240.36, *Instructions for Flight Inspection Reporting,* Appendix 22, when completing FAA Form 8240-22, Facility Data.

4.12. AF IMT 3637, *Instrument Approach Procedures*. Complete this IMT manually when documenting USAF instrument approach procedures not automated by GPD. It provides a permanent record of data available at the time of original/amended procedural development. Complete all blocks on the IMT. Enter "NA" where data is not authorized/applicable. Attach computation forms (manual or automated), as applicable.

4.12.1. Item 1. **Name of Airfield.** Enter the name of the airport. Also include the four-letter or alphanumeric ICAO designator.

4.12.2. Item 3. **Procedure Identification.** Enter the procedure identification according to AFMAN 11-226(I), Volume 1, Chapter 1, Section 6. When amending a procedure, enter the amendment number after the procedure ID. Amendments to procedures will be numbered sequentially beginning with "1" and are required for all procedural changes to the IAP (see paragraph **6.2.**). Amendment changes are not required for editorial corrections (AFMAN 11-226(I), Volume 1, paragraph 142). For Foreign Terminal Instrument Procedures, enter the identification verbatim, as published by the host nation.

4.12.3. Item 4. **Aerodrome Reference Point.** Enter coordinates in WGS 84 (when available) to the nearest hundredth of a second. When WGS 84 data is not available, state the datum used to express this point. This point should be the location used to determine actual magnetic and grid variations.

4.12.4. Item 5. **Effective Date.** The final review authority will enter, or instruct the requesting unit to enter, the effective date after coordinating the actual publication date with the National Geospatial-Intelligence Agency (NGA). Units should coordinate with all affected air traffic control agencies for interfacing with publication cycles and integration into the ARTCC computer system. Indicate whether the procedure is an original or an amendment.

4.12.5. Item 6. **Radio Frequencies.** Indicate one primary VHF and one primary UHF frequency for the functions listed and any other agency, as required.

4.12.6. Item 7. **Plan View.**

4.12.6.1. **Radar Procedures.**

4.12.6.1.1. Depict radar arrival routes from the Intermediate Fix (IF) to the Missed Approach Point (MAP), when Minimum Vectoring Altitude (MVA)/diverse vectors are used for the initial segment. Depict all radar arrival routes to the pre-established pattern when a specific radar pattern is used for the initial segment.

4.12.6.1.2. Depict IF, FAF, MAP, step-down fix(es) and other fixes, as applicable.

4.12.6.2. **Non-Radar Procedures.**

4.12.6.2.1. **Facilities/Fixes and Waypoints.** Depict the name, type, frequency or channel number, identification, emission (as required), and coordinates, to the nearest hundredth of a second, of each facility, fix, or waypoint, as appropriate, used in the procedure. Intersection and DME fixes used in the procedure should show the name and how formed. Show bearings and distances to facilities or fixes to the nearest degree and mile.

4.12.6.2.2. **Transition Altitude (TA) and Transition Level (TLv).** Depict the TA and TLv on procedures as established by national authorities. This information is needed primarily in overseas areas. Additional information can be found in FLIP General Planning.

4.12.6.2.3. **Holding Patterns.** Depict holding patterns to include holding fix, inbound and outbound courses, direction of turn, and leg lengths. Depict DME values at the end of each holding pattern. When leg lengths are defined by time and are nonstandard, indicate the nonstandard time positioned within the holding pattern symbol. **Publish the maximum holding airspeed when the holding pattern was designed for less than 310 knots** (e.g., "Max holding 265 KIAS").

4.12.6.2.4. **Feeder Routes.** Develop and/or depict routes frequently used by ATC and local aircrews. The operational service volume of and any known restriction to each NAVAID used should be considered prior to establishing feeder routes.

4.12.6.2.4.1. **High Altitude IAP Outer Ring.** Depict facilities or fixes which are part of the enroute high altitude airway structure as published on the enroute high altitude chart to include routing, distance, and MEA to the IAF, holding fix, or feeder facility.

4.12.6.2.4.2. **High Altitude IAP Middle Ring.** Depict facilities or fixes that are not part of the enroute high altitude airway structure. Facilities that are part of the enroute low altitude airway structure and used for transition from high to low or to eliminate ESV problems should be shown on this ring. Facilities or fixes on this ring must have a transition from a facility or fix on the outer ring. Include routing, distance, and MEA to the IAF or holding fix. Facilities on this ring must include the name, frequency/channel number, as appropriate, and identification. The depiction of these fixes must show how they are formed.

4.12.6.2.5. **IAP Depiction.**

4.12.6.2.5.1. All items depicted within the inner ring should be drawn to scale. Range radius is 10 NM for low altitude IAPs and 20 NM for high altitude IAPs. Recommend scales for the inner ring designed on engineer ruler 60 scale: 10 ticks = 1 NM for low altitude IAPs and 5 ticks = 1 NM for high altitude IAPs. Center the IAP drawing on the NAVAID that provides final approach guidance. Depictions may be offset in order to make better use of the planview area. Orient the IAP depiction to true north.

4.12.6.2.5.2. Include the following items: IAF(s)/IAWP(s), IF/IWP, FAF/FAWP, stepdown/ATD fixes, MAP/MAWP, and other fixes/waypoints, as applicable.

NOTE: "FAF-only" instrument procedures shall not be developed. At a minimum, an intermediate or holding segment must be depicted joining the final approach segment.

4.12.6.2.5.3. Depict the routing of all IAP segments to include headings, radials, bearings, arcs, course, procedure turn (PT), or holding pattern in lieu of PT.

4.12.6.2.5.4. Depict each controlling obstruction within a 10 NM radius (low altitude) and a 20 NM radius (high altitude) which fall within the initial, intermediate, final, circling, and missed approach areas. Other significant obstacles in or near these areas may be charted within the inner ring when deemed critical to flight safety. Explain obstacles located near the final approach area edge, excessively high terrain that parallels the final approach area edge and/or the intermediate boundary areas, etc., in a note. When portrayal of several obstructions within a small area would clutter the chart, only the highest obstacle of that group need be shown. The MSL elevation of the obstacle shall be indicated to the nearest foot.

4.12.6.2.5.5. Use symbols listed in the "LEGEND INSTRUMENT APPROACH PROCEDURES (CHARTS)" section of the DoD FLIP. Symbol drawings do not need to be to scale; however, they should adequately portray required information to publication agencies.

4.12.6.2.5.6. Depict hydrographic features, international boundaries, and/or special use airspace (SUA), as applicable.

4.12.7. Item 8. **Minimum Safe/Sector Altitude (MSA).** When sectorizing the MSA, depict the sectors clockwise between magnetic bearings toward the NAVAID. Depict the MSA as shown in the "LEGEND INSTRUMENT APPROACH PROCEDURES (CHARTS)" section of the DoD FLIP.

4.12.8. Item 9. **Vertical Velocity (V/V) Chart.** Missed approach climb gradients in excess of 200 ft/NM are nonstandard, require waiver action, and shall be published as vertical velocities in feet per minute (FPM). Publish these climb gradients in 60-knot increments from 60 knots to 300 knots (low IAPs), 120 knots to 360 knots (high IAPs), or as requested (see paragraph **3.3.8.3.**). Publish the termination altitude of the missed approach climb gradient in a note just above the V/V chart. Use the following format: "CAUTION: Missed Approach Minimum Climb Rate to (altitude)".

4.12.9. Item 10. **Field Elevation.** Enter the elevation of the highest point on the usable landing surface.

4.12.10. Item 11. **Touchdown Zone Elevation.** Enter the elevation of the highest point in the first 3000 feet of the approach end of the runway rounded to the nearest whole foot.

4.12.11. Item 12. **Profile.**

4.12.11.1. **Radar Procedures.**

4.12.11.1.1. Depict radar arrival routes from the Intermediate Fix (IF) to the Missed Approach Point (MAP), when Minimum Vectoring Altitude (MVA)/diverse vectors are used for the initial segment. Depict all radar arrival routes to the pre-established pattern when a specific radar pattern is used for the initial segment. Include headings, radials, bearings, arcs, and courses.

4.12.11.1.2. Depict IAF/IF when a specific radar pattern is used. Depict FAF, MAP, stepdown fixes, or other fixes, as applicable, with associated altitude information as shown in the "LEGEND INSTRUMENT APPROACH PROCEDURES (CHARTS)" section of the DoD FLIP.

NOTE: At a minimum, an intermediate segment must be depicted joining the final approach segment.

4.12.11.1.3. Indicate glidepath angle and threshold crossing height (TCH) on PAR procedures.

4.12.11.1.4. Depict ASR recommended altitudes and distances across the top portion of the profile. Compute altitude information according to **Table 4.1.** of this AFI.

4.12.11.1.5. Indicate FAF to MAP and MAP to runway distances as shown on FLIP IAP charts.

4.12.11.1.6. Missed approach instructions are not required in the profile section.

4.12.11.2. **Non-Radar Procedures**.

4.12.11.2.1. Include the following items: IAF(s), IF, FAF, stepdown fixes, MAP, and other fixes, as applicable. Depict the routing of all IAP segments to include headings, radials, bearings, arcs, course, procedure turn (PT), or holding pattern in lieu of PT.

NOTE: "FAF-only" instrument procedures shall not be developed. At a minimum, an intermediate or holding segment must be depicted joining the final approach segment.

4.12.11.2.2. Include associated altitude information with fixes listed in paragraph **4.12.11.2.1.**.

4.12.11.2.3. Enter the Visual Descent Point (VDP) DME value.

4.12.11.2.4. Indicate glidepath angle (GPA), TCH, glidepath intercept altitude, and height of the glidepath at the localizer FAF on ILS procedures. Indicate the radio altimeter (RA) height at the DA point on CAT II ILS procedures.

4.12.11.2.5. Indicate the Vertical Path Angle (VPA) or descent angle and TCH on non-precision procedures.

NOTE: When the published descent angle and VGSI angle are not coincident, publish the following note: "VGSI and descent angles not coincident."

4.12.11.2.6. Indicate FAF to MAP and MAP to runway distances as shown on FLIP IAP charts. Indicate distance between the DA point and runway threshold in feet on CAT II ILS procedures.

4.12.11.2.7. Missed approach instructions are not required in the profile section except when the IMT is used as the sole support for exercise or actual contingency operations.

4.12.11.2.8. Transition Altitude (TA) and Transition Level (TLv). Depict the TA and TLv on procedures as established by national authorities. This information is needed primarily in overseas areas. Publish transition altitude(s) to the nearest 100 feet and flight levels as specified. Additional information can be found in FLIP General Planning.

4.12.11.2.9. Airport Sketch. Include this drawing only when the AF IMT 3637 is used for exercises or contingency operations. Drawing need not be to scale. Draw the runway and depict its length and width as shown on FLIP IAP charts. Indicate approach lighting identification, Visual Glideslope Indicator (VGSI), and runway lighting as shown on FLIP IAP charts and according to AFMAN 11-226(I), Volume 1, Appendix 5.

4.12.12. Item 13. **Minimums.**

4.12.12.1. Enter procedure name i.e., ILS-36; LOC-36; TAC-36; CIRCLING; etc., under "CAT/APP".

4.12.12.2. Enter MDA or DA, as appropriate; RVR (when not available, enter prevailing visibility); HAT or HAA; and ceiling and visibility for each category. Categories may be combined when none of the minima elements differ. Enter "NA" where minima are not authorized/applicable.

4.12.13. Item 14. **MAG/GRID Variation (Actual).**

4.12.13.1. **Magnetic Variation (MV).** Enter the airport MV of Record and the associated Epoch Year value as currently assigned by the Aviation Systems Standards (AVN) office of the FAA. (Example: 8°W/2005). The MV of Record and the assigned variation used to orient the NAVAID during the commissioning flight inspection or subsequent periodic inspections may be different. Projected MV and the MV of Record should also be available from the supporting MAJCOM.

4.12.13.2. **Grivation (GV).** Grivation is the difference between the directions of the magnetic lines of force and Grid North. GV is similar to variation and used to convert magnetic headings to grid headings and vice versa. When the location is north of latitude 67° N or south of latitude 67° S, enter the GV to the nearest degree.

NOTE: AFPAM 11-216, Chapter 14, explains grid navigation and contains formulas for computing GV.

4.12.14. Item 15. **MAG/GRID Variation (Slave).**

4.12.14.1. Enter the current assigned variation for the NAVAID providing final approach course (FAC) guidance as obtained from the Aviation Systems Standards (AVN) office of the FAA. This information should also be available from the supporting MAJCOM.

4.12.14.2. Enter the current MV assigned to the ASR system for ASR approach procedures. This information can be obtained from maintenance personnel by direct reading of equipment or from the ATCALS evaluation report.

4.12.15. Item 16. **Time/Distance Table.** Enter minutes and seconds in the table based on FAF to MAP distance displayed in the profile section. Compute data as follows: (Distance X 60) divided by Knots = Minutes and Decimal minute. Decimal minute X 60 = seconds.

NOTE 1: Timing is required when the final approach does not terminate at a published fix, as is usually the case with VOR, NDB, and localizer approach procedures.

NOTE 2: Use of the middle marker as the sole means of identifying the MAP is not authorized. The middle marker may assist aircrews in identifying the MAP on certain localizer approaches provided it is coincident with the published localizer MAP.

4.12.16. Item 17. **Precision Data.** Enter runway number, GPI, RPI, TCH, and GS angle for precision approaches. Enter VGSI RRP for all procedures.

NOTE: For TCH determination, see AFMAN 11-226(I), Volume 3. Enter TCH information to the nearest hundredth of a foot and publish to the nearest foot.

4.12.17. Item 18. **Approach Information.** Enter the bearing and distance from the FAF to the MAP. Enter the missed approach instructions describing the missed approach in detail (include missed approach track, altitude, holding and other instructions, as applicable). When the MAP is based on time and distance, enter the FAF to MAP times in Item 16. When a missed approach climb gradient is required, enter the associated vertical velocity (V/V) in Item 9.

4.12.18. Item 19. **Approach/Missed Radials.** List the radials for the initial, intermediate, final and missed approach selected for flight inspection of the IAP.

NOTE: Publish the radial to the nearest whole degree (i.e., 0.49 degrees or less round down, 0.50 degrees or greater round up).

4.12.19. Item 20. **Additional Information.**

4.12.19.1. Item 20. The ESV block serves as a reminder to request expanded service volume checks when required (see paragraph 2.4). ESV checks apply to distance and altitude. In addition to terminal NAVAIDs, the ESV check may be required for feeder facilities. NAVAID classifications and service volume of each are listed in FLIP. Enter either "N/A" or "See attached FAA Form 6050-4".

4.12.19.2. Airspace requirements are according to AFI 13-201.

4.12.20. Item 21. **Waivers.** List all waivers required for new or amended procedures. List the Control Number assigned by HQ AFFSA to each approved waiver on file for amended procedures and the approval date for each.

4.12.21. Item 22. **Airfield/NAVAID Data.** Enter the coordinates for the approach end and departure end of the runway documented in Item 17. Enter the coordinates for the primary NAVAID providing final approach course guidance. Enter coordinates for the secondary NAVAID (GS antenna or other), as appropriate.

4.12.22. Item 23. **Obstacle Data.** List obstacle data as follows:

4.12.22.1. **Segment.** Initial, intermediate, final, missed approach, circling. Identify all stepdown fixes used. Stepdown fixes in the final segment will be listed as "FINAL (FAF - Stepdown Fix)" on one line followed on the next line with "FINAL (Stepdown Fix - MAP)".

4.12.22.2. **Controlling Obs No/Description.** Describe the controlling obstacle (terrain + trees, tower, etc.). Do not include any 'number ('No').

4.12.22.3. **Elevation and Coordinates.** Enter MSL elevation of obstacle to the nearest foot. Enter location of obstacles by latitude and longitude to the nearest second. Indicate source of information above coordinates (JOG NM 14-2).

4.12.23. Item 24. **Holding Data.** Document the data used to develop each holding pattern. When the procedure includes more than 3 holding patterns, include the data for the additional holding patterns in Item 31, Remarks.

4.12.23.1. Item 24.A. Enter the NAVAID name and 3-letter identification.

4.12.23.2. Item 24.B. Enter the radial or bearing and DME, as applicable, of the holding fix. When DME for the holding fix is not derived from the holding NAVAID or a co-located source, identify the source.

4.12.23.3. Item 24.C. List the holding template number used based on the maximum holding altitude used by ATC. Document the turn direction as "RT" for right turns and "LT" for left turns. Example: #8/LT.

4.12.23.4. Item 24.D. List the maximum holding altitude allowed for aircraft holding in this pattern.

4.12.23.5. Item 24.E. Indicate the maximum airspeed (A/S) allowed for aircraft holding in this pattern.

4.12.23.6. Item 24.G. Enter controlling obstacle latitude and longitude to the nearest second.

4.12.23.7. Item 24.H. Indicate minimum holding altitude. List ROC value when other than 1000 feet.

4.12.24. Item 25. **Minimum Sector Altitude.** Define sector(s) clockwise between bearings to the NAVAID. Documentation here should agree with the MSA depiction in Item 8. Enter the MSA minimum altitude (obstacle MSL height plus 1000 feet ROC rounded to the next higher 100-foot increment) in the 'MSA' column. NGA will verify this data.

4.12.25. Item 26. **Emergency Safe Altitude.** Emergency Safe Altitude (ESA) is approved by MAJCOM.

4.12.26. Item 27. **Feeder Routes.** List the feeder routing required by procedure. When minimum reception altitude (MRA) is required, document rationale in remarks.

4.12.27. Item 28. **Visual Aids.** Enter the type ***and*** length of approach lights used to reduce visibility minima. Enter the type ***and*** spacing of runway lights used to determine RVR minima values. Indicate yes or no, as appropriate, when touchdown zone and centerline lighting are or are not available. Enter VGSI GS angle.

4.12.28. Item 29. **No-Light Visibility.** Enter the no-light visibility values. When a credit for lights was taken in accordance with AFMAN 11-226(I), Volume 1, Chapter 3, a note shall be published on the approach plate/Radar minima section, indicating the increase that has been added to published minimums, segregated by approach categories when different. Example: "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 1¾ miles".

4.12.29. Item 30. **ASR Recommended Altitudes.** Enter the recommended altitudes for surveillance approaches. Compute recommended altitudes according to **Table 4.1.** of this AFI.

4.12.30. Item 31. **Remarks.** The remarks section is used to expand or explain any items on the IMT. Explanations should be concise and identify specific affected items on this IMT or a specific paragraph reference in regulations pertaining to IAP criteria. Use bond paper to continue remarks and attach it to the IMT.

4.12.30.1. Publish descent information for all nonprecision approach procedures (except ASR) by entering the descent angle and TCH data from the FAF and/or last stepdown fix location to the threshold of the landing runway. When multiple stepdown fixes are published, publish the descent gradient from the last stepdown fix (the stepdown fix closest to the runway threshold) to the threshold of the landing runway. Use the following format: "(FAF or S/D fix) to (FEP): (angle/TCH)"; e.g., "Publish descent angle and & TCH as follows: LEXXY to RW19L: 3.00/59." Do not use degree (°) or feet (') symbols.

NOTE: Publishing the descent angle on nonprecision approach procedures is required but informational only. There is no instrument in the aircraft that provides deviation from descent angle information. Aircraft are authorized descent to the MDA at their discretion.

4.12.30.2. Document the ALS inop note, verbatim, here, when applicable.

4.12.31. Item 32. **Procedure Requester(s).** Enter the agency (unit/office symbol) and date of the request for IAP development. This information will be used by MAJCOM TERPS Branch to maintain IAP OPR listing.

4.12.32. Item 34. **Approval Signatures**.

4.12.32.1. Items 34a-b. Obtain the signature(s) of the flyability check and/or flight inspection pilot, as applicable.

NOTE: When the IAP was developed using NAVAIDs not maintained or flight inspected by a US agency (e.g., host nation NAVAID), enter a statement in the flight inspection pilot block to denote the agency (or country) performing the flight inspection of the facility and, when available, the date of the last inspection. Ensure any flight inspected and/or reported restrictions to the NAVAID are accounted for when developing the procedure.

4.12.32.2. Item 34c. **Approving Authority Signatures**. All signature blocks shall be signed, as required. At a minimum, the "Procedure Specialist," "Air Traffic Operations Manager" (at locations where the USAF has development responsibility), "Senior Operational Commander," and "MAJCOM TERPS Branch" signatures shall be obtained. When the procedure's protected airspace overlaps into adjacent ATC airspace, ensure coordination signatures are obtained from that facility. The "MAJCOM (WAIVER)" block must be signed by the MAJCOM/DO or formally designated representative, as outlined in MAJCOM Supplement to AFI 11-230. Include an explanation when signatures cannot be obtained.

NOTE 1: Signature blocks shall include printed name, rank/grade, and office symbol.

NOTE 2: The "Senior Operational Commander" block for Foreign Terminal Instrument Procedures shall be signed by the MAJCOM/DO or formally designated representative and signifies compliance with paragraph **1.4.3.**. At locations where the USAF has procedure development responsibilities, the Senior Operational Commander's designated representative is the primary Wing Director of Operations (DO) responsible for flight operations.

4.13. Precision Computations. Precision computations will be accomplished manually (or augmented using self-calculating spreadsheets) when documenting precision instrument approach procedures not

automated by GPD. All calculations, distance measurements, and associated drawings shall be a part of the procedure package.

4.14. AF IMT 3640, *Nonprecision Computations.* Complete this IMT manually when documenting USAF instrument approach procedures not automated by GPD.

4.14.1. Item 1. **MDA Based on Final Approach Segment.** Space is available to compute two types of approaches when a combined approach is being designed. The calculations are self-explanatory. Use the ROC value given in the proper chapter in AFMAN 11-226(I) for the type of approach.

4.14.2. Item 2. **MDA Based on Missed Approach.** The published MDA must also provide clearance over obstacles in the missed approach area. The calculations are self-explanatory. Due to separate obstacle areas evaluated for each category of aircraft making a turning missed approach, different MDA values could be calculated for each category. In this case, make the computations shown in Item 2 for each applicable category and enter the associated obstacle data in the remarks area of Item 10. When an obstacle penetrates the obstacle clearance surface (OCS), the MDA must be increased or a climb gradient provided. When a combination straight and turning missed approach is required or desired, refer to AFMAN 11-226(I).

4.14.3. Item 4. **Missed Approach Climb Gradient if Penetration Still Exists.** Do not use this section to compute missed approach climb gradients. See paragraph **A4.10.** for more guidance.

4.14.4. Item 8. **Visibility With Approach Lights.** Visibility may be reduced when approach lights are available and the operational conditions in AFMAN 11-226(I) are met. Use the format on the IMT to determine visibility with approach lights. Enter the associated RVR value (if any) for each aircraft category.

4.14.5. Item 9. **Published Minima.** Enter the controlling values from Items 1 through 8. Show these values in the FLIP minimum section format. When a Foreign Terminal Instrument Procedure is being validated, show the host minima here. Minima may be combined for categories when no differences exist. The highest minima (AFMAN 11-226(I)/AATCP-1(B)/host nation) shall be entered in the minima section of AF IMT 3637.

4.14.6. Item 10. **Changes in Published Visibility Minima Without Approach Lights.**

4.14.6.1. Enter only the changes that will be made to establish no-light minima.

4.14.6.2. Remarks. This section is used to expand or explain any item(s) on the IMT. It may be continued on plain bond paper, when required. Explanations/Calculations should be concise and identify specific items or a specific paragraph reference in a regulation pertaining to data herein.

4.15. AF IMT 3641, *Visual Portion of Final Worksheet.* Complete this IMT manually when documenting USAF instrument approach procedures not automated by GPD to evaluate the visual portion of final for runways with or without Visual Glide Slope Indicator. When multiple minimums are published, enter the lowest MDA in computations.

4.15.1. Section I. **SUMMARY INFORMATION (Result Data for Publication)**

4.15.1.1. Item 1. Enter result from Section II, item H or from AFMAN 11-226 (I) Volume 3, Table 2-3.

4.15.1.2. Item 2. Enter result from Section III, item E or Section IV, item E.

4.15.1.3. Item 3. Enter results from Section VII, item G.

4.15.1.4. Item 4. Enter Yes or No (after completing section VI).

4.15.1.5. Item 5. Enter Yes or No (after completing section V).

4.15.1.6. Item 6. Enter Yes or No (after completing section VI).

4.15.2. Section II. **DETERMINATION OF TCH WITH VGSI**

4.15.2.1. Item D. Enter distance in feet along centerline.

4.15.2.2. Item E. Enter tangent of VGSI angle (i.e., VGSI angle is 3°, enter its tangent (0.0524).

4.15.3. Section III. **DETERMINATION OF VDP WITH VGSI**

4.15.3.1. Item B. Enter value from section II, Item H.

4.15.3.2. Item D. Enter tangent of VGSI angle (i.e. VGSI angle is 3°, enter its tangent (0.0524).

4.15.4. Section IV. **DETERMINATION OF VDP WITHOUT VGSI.** Item D. Enter tangent of descent angle or 3°, whichever is greater (i.e., descent angle is 2.5°, 3° is greater, enter tangent of 3° (0.0524).

4.15.5. Section V. **OBSTACLE CLEARANCE DETERMINATION, 20:1**

4.15.5.1. Item A. Self-explanatory. See AFMAN 11-226(I), Volume 1, Figure 14-5 or Figure 14-6A.

4.15.5.2. Item G. Subtract item F from item E and enter result. Also, answer "Yes" or "No" in Section I, Items 5 & 6.

4.15.6. Section VI. **OBSTACLE CLEARANCE DETERMINATION, 34:1**

4.15.6.1. Item A. Self-explanatory. See AFMAN 11-226(I), Volume 1, Figure 14-5 or Figure 14-6A.

4.15.6.2. Item G. Subtract Item F from Item E and enter result. Also, answer "Yes" or "No" in Section I, Item 4.

4.15.7. Section VII. **DME FIX AT VDP.** ***Note:*** First row is a calculation area. Result used in Item D.

4.15.7.1. Item A. Measure along centerline from abeam facility to EOR.

4.15.7.2. Item B. Enter value from Section III, Item E or Section IV, Item E.

4.15.7.3. Item D. Enter value from first row.

4.16. AF IMT 3642, *Circling Computations.* Complete this IMT manually when documenting USAF 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.

4.16.1. Item 1. **Circling Minimum Descent Altitude (CMDA) Based on Obstacle Clearance.** Ensure any expanded circling area obstacles are considered when applying criteria in **Attachment 3**, paragraph **A3.1.23.**. The highest obstacle in the circling or expanded obstacle clearance area shall be used.

4.16.2. Item 5. **Minima.** Show these values in the FLIP minima section format. The highest minima shall be entered in the minima section of AF IMT 3637.

4.17. DELETED.

4.18. AF IMT 3982, *GPS/RNAV Combination Straight and Turning Missed Approach Length of Section 1.* Do not use this IMT for procedures not supported by GPD. When necessary, document all manual calculations and include in procedure package.

Chapter 5

INSTRUMENT PROCEDURE PROCESSING

5.1. Requesting, Processing and Publishing Instrument Procedures.

5.1.1. In order for a new instrument procedure to be published, a requesting agency (i.e., MAJCOM, Air Force Component of a Unified Command, Unit Flying Organization, etc.) must identify the requirement and submit a request to the TERPS authority responsible for that location. At a minimum, requests should contain:

5.1.1.1. Name of the airfield or location desired.

5.1.1.2. Type of procedure. Examples: High or Low Altitude, Very High Frequency Omni-Directional Range (VOR); Instrument Landing System (ILS); and Tactical Air Navigation (TACAN).

5.1.1.3. Aircraft categories that will use the procedure.

5.1.1.4. 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.

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

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

5.1.1.7. Number of copies required if the procedure will be published in loose-leaf format.

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

5.1.2. The requesting agency should evaluate on a case-by-case basis the need to publish procedures at alternate airports or airports not frequently used and may recommend, with justification, a procedure for inclusion in the appropriate DoD FLIP. The request shall be sent with specific justification to the appropriate MAJCOM TERPS authority.

5.1.3. The requesting agency may request new instrument approach or departure procedures at domestic civil airports IAW FAA Order 8260.32.

5.1.4. The requesting agency shall forward publication requests for civil procedures to the proper MAJCOM TERPS office. Base requests for publication of civil approaches in DoD FLIP on operational requirements.

5.1.5. All instrument procedures will be published and distributed by NGA, except when a unique situation exists where there is an urgent need (due to war time/contingency operations, etc.) for the procedure and NGA will not be able to support the short notice requirement before it is needed. In this instance, MAJCOMs may locally process, publish and use these procedures until receipt of the NGA product.

NOTE: Do not send instrument procedures to NGA for loose-leaf publication when the procedure is only required for 30 days or less and NGA will not be able to support the short notice requirement before it is needed.

5.1.5.1. Upon completion, MAJCOMs shall immediately send HQ AFFSA/XOI an information copy of the locally published FLIP (export as a minimum the FLIP graphic depiction).

5.1.5.2. Locally published instrument procedures shall conform to IACC specifications to the maximum extent possible, contain an expiration date, a point of contact, and, if applicable, exercise name and the unit designation(s) of authorized users.

5.1.5.3. When a procedure is in the developmental phase, a MAJCOM/unit may produce a product for review and/or coordination purposes, and one of the following notes shall be published on the planview: "NOT FOR NAVIGATIONAL USE" or "FOR USE BY FLYABILITY/FLIGHT CHECK AIRCREW ONLY".

5.1.6. Publication of RADAR procedures.

5.1.6.1. Airborne RADAR Approaches (ARAs) shall be published in a graphic format (planview and profile).

5.1.6.2. PAR/ASR approaches are published in text format in Terminal FLIP products in the section identified as "RADAR INSTRUMENT APPROACH MINIMUMS". However, there may be situations where the PAR/ASR procedure is complex or in an obstacle rich environment, etc., which could justify publication in the graphic format also. Specifications exist for NGA to publish this type of portrayal.

5.1.6.3. Do not publish a descent angle/gradient for ASR approaches.

5.1.7. Contingency Operations. When a TLE is established IAW paragraph **1.4.1.2.**, process instrument procedure requests in support of contingency operations IAW this chapter and the following:

5.1.7.1. The TLE shall validate all contingency TERPS requirements to the maximum extent possible prior to requesting TERPS assistance from the applicable MAJCOM. The TLE shall refer to the TERPS AOR alignment as outlined in paragraph **1.4.** when determining the Office of Primary Responsibility (OPR) for each requirement.

NOTE: Central and South American requirements may be directed to HQ AMC AOS/OL-J.

5.1.7.2. The MAJCOM assigned the TERPS tasking (OPR) by the TLE shall develop and process each instrument procedure. Initially, these procedures will not be published in DoD FLIP and therefore will be classified and treated as a special use instrument procedures IAW paragraph **5.8.**.

5.1.7.3. The TLE shall coordinate with the OPR to determine format (hard copy, electronic copy, and/or acetate) and initial distribution requirements. The OPR shall forward the appropriate AF IMT(s) to NGA IAW paragraph **5.1.8.**, for loose-leaf publication. Subsequent distribution to aircrews of the NGA produced loose-leaf product shall be made by the TLE.

5.1.7.4. The MAJCOM developing instrument procedures for contingency operations shall be responsible for maintaining them for as long as required and shall provide the TLE with any changes requiring coordination within the using command. Close coordination between the OPR and TLE is essential to ensure safety of flight is not compromised at any time during the contingency operation.

5.1.8. Instrument Procedure Documentation and Processing. Create and maintain a procedure package folder containing all hard and soft-copy documentation listed below.

5.1.8.1. Required hard copy (paper) documentation includes the computer generated Approach/Departure Report and AF IMT 4333, Approach/Departure Signature Page. For procedures developed on USAF bases with a CE function, also include a completed AF IMT 813, Environmental Impact Statement.

NOTE: GPD will also output hard copy Obstacle Quality and Workspace Quality Reports, however these are intended to assist in aeronautical data resolution. Maintaining hard copies of these documents is not required.

5.1.8.1.1. Also include all hard copy source documentation relating to aeronautical or obstacle data revisions pertinent to the chart to include hard copy correspondence to MAJCOM TERPS function providing rationale for the change(s).

5.1.8.2. Required Soft Copy (electronic) documentation includes the entire content of the [procedure name] export folder to include the following files:

5.1.8.2.1. [workspace name].wks

5.1.8.2.2. [workspace name].xml

5.1.8.2.3. [procedure name].dbf

5.1.8.2.4. [procedure name]BLD.pdf

5.1.8.2.5. [procedure name]BLD.xml

5.1.8.2.6. [procedure name]PUB.pdf

5.1.8.2.7. [procedure name]PUB.xml

5.1.8.2.8. [procedure name].shp

5.1.8.2.9. [procedure name].shx

5.1.8.2.10. [procedure name].xml

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

5.1.8.2.12. [procedure name]-[date]-DEF.txt

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

5.1.8.2.14. [procedure name]-Waiver.pdf (when applicable). Note that there will be one waiver form for each non-standard condition, and labeled sequentially. Each must be retained as part of the procedure package.

5.1.8.2.15. Expanded Service Volume Request.pdf. The blank form is not required to be included in the electronic package, but is mandatory if completed.

5.1.8.2.16. [procedure name].Flyability.pdf

5.1.8.2.17. Radio Fix and Holding Data Record.pdf. Blank (fillable) form. Must be completed and saved.

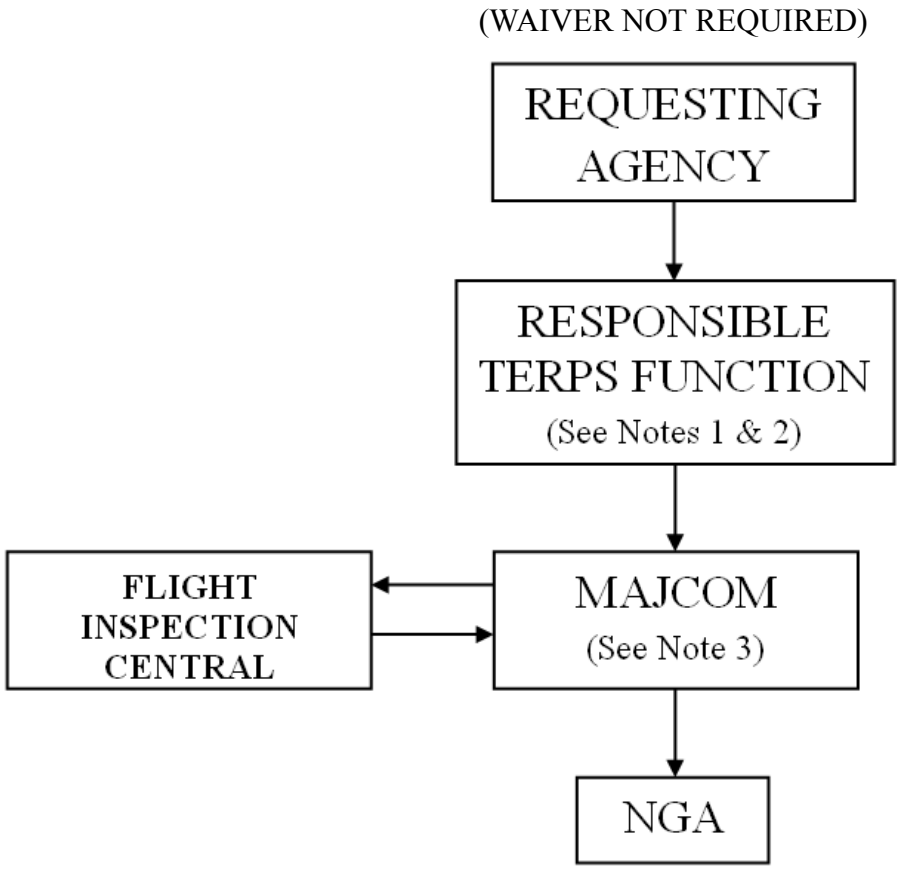
NOTE: During procedure export, GPD will prompt the user for a ‘save to’ location for the electronic files. The default is to the drive containing the “USAFIPD” directory in the ‘export’ folder under the specific procedure name. Ensure all required electronic files are selected prior to export and save to the workstation's hard drive.

5.1.8.2.18. In addition to GPD produced export files, include additional electronic documentation (to include scanned versions of hard copies) relating to aeronautical or obstacle data revisions pertinent to the procedure, along with correspondence to the MAJCOM TERPS function providing rationale for the change(s). Note that only the completed signature page (AF IMT 4333 Approach/Departure Signature Page) must be scanned and saved to electronic media, not the entire procedure Report.

5.1.8.3. Coordination (standard GPD procedure).

5.1.8.3.1. Prior to submitting to the MAJCOM TERPS function for review and approval, obtain required signatures on the hard copy procedure publication report. Along with the publication report, provide non-TERPS reviewers (senior operational commander, ATC, etc.) the FLIP graphic depiction along with other pertinent documentation/computations. Scan and add completed form to electronic documentation files.

Figure 5.1. Processing Standard Instrument Procedures.



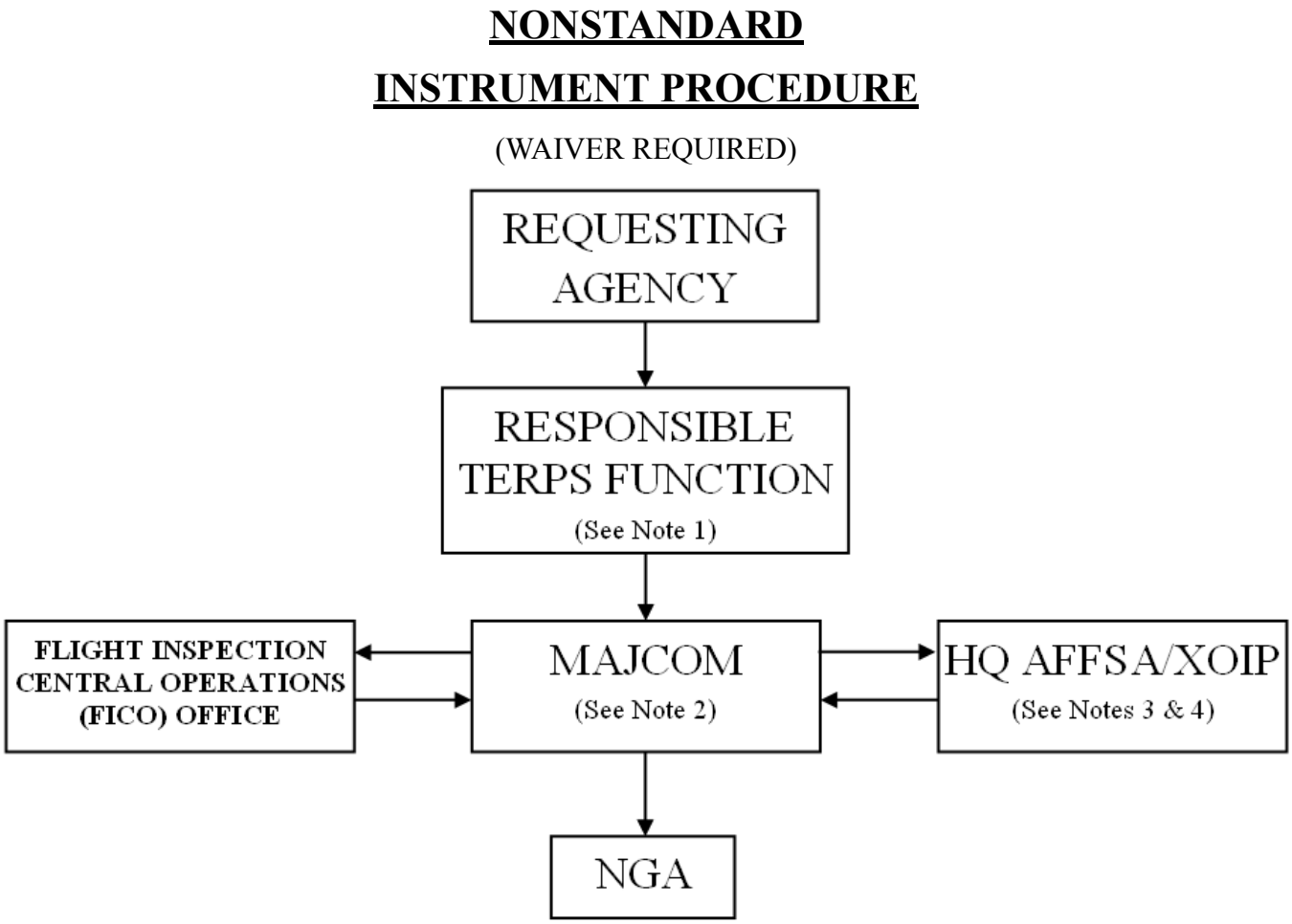
NOTES:

1. At locations where a qualified TERPS specialist is not available to develop and locally coordinate procedures, development and local coordination will be performed by the supporting MAJCOM.

2. When final review and approval authority is delegated below the MAJCOM, the approving unit will send the approved procedures to NGA for publication and a copy to the responsible MAJCOM.

3. After the MAJCOM TERPS office has reviewed, approved, and signed the procedure, it must be forwarded to the FAA for flight inspection services. See paragraph **8.3.1.** for conditions when flight inspection is not required.

Figure 5.2. Processing Nonstandard Instrument Procedures.



NOTES:

1. At locations where a qualified TERPS specialist is not available to develop and locally coordinate procedures, development and local coordination will be performed by the supporting MAJCOM.

2. After the MAJCOM TERPS function has reviewed and approved the nonstandard procedure, and after the MAJCOM/DO or the CFACC/JFACC has approved the nonstandard procedure, it must be forwarded to the FAA for flight inspection services. See paragraph **8.3.1.** for conditions when flight inspection is not required.

3. HQ AFFSA is the final approving authority before publication of nonstandard instrument procedures. All items/approval signatures must be completed before submitting to HQ AFFSA, including flyability check and flight inspection. When a waiver to criteria is questionable and the potential exists for disapproval due to being extreme in nature, contact AFFSA/XOIP for guidance prior to scheduling flight inspection.

4. HQ AFFSA/XOIP will advise MAJCOMs of waiver approval or disapproval using AF IMT 3980, ***Waiver.***

Table 5.1. INSTRUMENT PROCEDURE PACKAGE CONTENT REQUIREMENTS

Reviewing Agency	Standard Instrument Procedure	Nonstandard Instrument Procedure	FTIP - Standard Instrument Procedure (See Note 1)	FTIP - Nonstandard Instrument Procedure (See Note 1)
MAJCOM TERPS	AF IMT 4332 or 4333 Computation Data* Maps, Charts, or Drawings * ESV (When Applicable) FAA Form 8260-2 (As Required) Supporting Documents AF IMT 3992 or IMT 3993 (Flyability Check) AF IMT 813	AF IMT 4332 or 4333 Computation Data* Maps, Charts, or Drawings * ESV (When Applicable) FAA Form 8260-2 (As Required) Supporting Documents** AF IMT 3992 or IMT 3993 (Flyability Check) AF IMT 813 AF IMT 3980 (Waiver)	AF IMT 4332 or 4333 Computation Data* Maps, Charts, or Drawings * ESV (When Applicable) FAA Form 8260-2 (As Required) Supporting Documents AF IMT 3992 or IMT 3993 (Flyability Check)	AF IMT 4332 or 4333 Computation Data* Maps, Charts, or Drawings * ESV (When Applicable) FAA Form 8260-2 (As Required) Supporting Documents** AF IMT 3992 or IMT 3993 (Flyability Check) AF IMT 3980 (Waiver)
MAJCOM/DO/ CFACC/JFACC (or equivalent)	N/A	AF IMT 4332 or 4333* AF IMT 3980 (Waiver)	N/A	AF IMT 4332 or 4333* Computation Data* Maps, Charts, or Drawings * Supporting Documents** AF IMT 3980 (Waiver)
AFFSA/XOIP/CC	N/A	All items listed above that are required for MAJCOM TERPS	N/A	All items listed above that are required for MAJCOM TERPS
NGA	AF IMT 4332 or 4333*	AF IMT 4332 or 4333*	See paragraph 7.1.13.	See paragraph 7.1.13.

* Printouts of computer generated procedure reports/forms 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 that are automated with USAF GPD. When submitting procedures to NGA for publication or revision, include all applicable FAA Form 8260-2s, as required.

** Supporting documentation includes all items that support the waiver request (i.e., coordination letters, maps, flight inspection report, manual computations not on AF IMTs, etc.). Only include supporting documentation for those portions of the procedure that are affected by the waiver. When publishing FTIP in DoD FLIP, appropriate AIP information for a foreign procedure and/or information obtained by agreement from the host nation are also supporting documentation. Any host nation documentation used to develop the procedure and not published in English shall be translated into English; include a copy of the translation in the procedure package.

NOTE:

1. Listed content requirements are for FTIP based on 'non-accredited' host nation source (locations not included on the USAF FTIP Acceptance List). See **Chapter 7** paragraph **7.1.13.** for package content and processing requirements for FTIP based on 'special accredited' and 'accredited' host nation source. See paragraph **5.5.1.2.2.** for exception to documentation requirements when processing short notice waivers.

5.1.8.3.2. ‘Zip’ all electronic files and upload to the AFFSA FTP site in the appropriate MAJCOM directory under ‘Uploads’, in the ‘Pending Review’ folder. Follow up with an email or phone call to the MAJCOM TERPS function indicating a new file has been uploaded.

5.1.8.3.3. The MAJCOM TERPS function shall download the zipped ‘export’ files and review the manual edits documented in the export package. If justification/source documentation is adequate, make necessary changes to aeronautical data and/or import manual obstacle changes from the [procedure name]-OBS.txt file into GPD prior to chart import. When aeronautical data revisions are necessary, coordinate with the AFFSA GPD help desk to initiate DAFIF correction.

CAUTION: Following the workflow in this order is necessary to correctly restore the procedure.

5.1.8.3.3.1. Import the procedure to complete the review process. Ensure that the date/time stamp associated with each page of the exported procedure report is consistent with the date/time stamp associated with the imported procedure. Review procedure/segment construction, approach minimums, climb gradients/climb to altitudes, and specified fix altitudes for compliance.

NOTE: Validate procedure violations and system generated notes against the exported procedure Report file ([procedure name].pdf) instead of opening the report from the restored procedure in GPD. If the restored procedure has violations not included in the exported report, it is likely due to differences in the aeronautical or obstacle data maintained by the export workstation and that on the import workstation. Ensure currency of DAFIF/DVOF and recheck for manual revisions.

5.1.8.3.3.2. When approving a procedure, print the hardcopy AF IMT 4333, Approach/Departure Signature Page included in the export package and sign in the MAJCOM TERPS block. Scan and add the electronic file to the list of files in the export package. Save an electronic copy of the entire package to removable electronic media for the MAJCOM archives. ‘Zip’ the package and upload to the AFFSA FTP site in the appropriate MAJCOM directory under ‘Uploads’ in the ‘Review Complete’ folder. Follow up with an email or phone call to the unit indicating a new file has been uploaded.

5.1.8.4. Coordination (non-standard, or manually developed procedure). The amount of manual computations, drawings, and other hardcopy documentation required in these packages make it impractical to transfer them electronically via FTP as outlined in paragraph **5.1.8.3.**. Process in accordance with **Figure 5.1.** or **Figure 5.2.**, as appropriate, and send the package to the appropriate reviewing agency(s) via surface mail.

5.2. MAJCOM TERPS Responsibilities.

5.2.1. Ensure all data required by AFMAN 11-225, Section 214, is submitted to the flight inspection office prior to flight check operations IAW time limits detailed in paragraph **8.2.2.**.

5.2.2. Submit all new standard or special use instrument procedures (to include civil and/or host nation procedures) to the Aeronautical Safety Division of NGA IAW this AFI as shown in **Figure 5.1.** or **Figure 5.2.**. Provide the GPD-produced publication report and FLIP graphic depiction for automated procedures.

NOTE: Non-procedural changes and recommendations for improvement of FLIP product content/format are normally submitted by airfield operations IAW *DoD FLIP General Planning*, Chapter 11.

5.2.3. Forward all CONUS and Alaska departure procedures published in the IFR Take-off Minimums and (Obstacle) Departure Procedures Section of the DoD FLIP and all CONUS and Alaska RADAR procedures published in the RADAR Instrument Approach Minimums Section of the DoD FLIP to the National Aeronautical Charting Office (NACO). These instrument procedures may be emailed to NACO at: mailto:9-AWA-NACO-NIMA4IAP@faa.gov.

5.2.4. Plan the operational date for new procedures to coincide with the applicable AIRAC cycle date IAW FLIP General Planning (GP), Chapter 11, *Revision Schedules*. When this is not possible, the following caveat shall be published on the approach/departure plate: "EFFECTIVE BY NOTAM". Do not use this caveat for more than 90 days. See AFJMAN 11-208, *Department of Defense Notice to Airmen [NOTAM] System,* for additional NOTAM guidance.

5.2.5. Publish instrument approach procedures in a graphic format (planview and profile). Text only instrument procedures (NOTAM, message, etc.) shall not be implemented except in extreme emergencies. AFFSA/XOIP shall be notified whenever "text only" instrument procedures have been implemented.

5.3. Unit TERPS Responsibilities.

5.3.1. Provide sufficient documentation in the procedure package to permit a rapid and complete check of the instrument procedure by reviewing agencies designated in **Table 5.1.**.

5.3.2. Develop and process new procedures predicated on a programmed NAVAID or new runway as soon as practical prior to the estimated commissioning of the new NAVAID or runway.

NOTE: When new instrument procedures are approved and ready for flight inspection, the flyability check and flight inspection requirements may be completed simultaneously during the NAVAID commissioning flight inspection (see paragraph **8.1.2.**).

5.3.3. New approach/departure procedures published in the DoD FLIP in advance of their effective date shall be published with the following caveat: "EFFECTIVE BY NOTAM". Issue a NOTAM stating the procedure is authorized for use immediately following successful flight inspection. Include any changes required by flight inspection in the NOTAM.

5.3.4. Compile and maintain procedure packages as outlined in **Table 5.1.** and paragraph **5.1.8.**. Legible photocopies, scans, or faxes of hard copy forms/reports are satisfactory substitutes for original documentation.

5.3.5. Supporting documentation that affected the planning of the procedure (engineering surveys, foreign nation Aeronautical Information Publication (AIP), NAVAID or airspace limitations, flight inspection results, etc.). Submit requests for Expanded Service Volume (ESV), FAA Form 6050-4, ***Expanded Service Volume Request***, IAW paragraph **2.4.**, and include any supporting documentation in the procedure package.

5.3.6. Instrument procedure packages supporting procedures intended only for loose-leaf publication require the same documentation as prescribed in paragraph **5.3.5.**. Submit requests to the MAJCOM TERPS Office and include a list of all the addressees and the number of copies sent to each (include the DoD Activity Address Code {DODAAC} of recipients); send one copy to AFFSA/XOIP.

5.3.7. Provide the technical expertise and procedure alternatives (equivalent level of safety) necessary to help in drafting any waiver justification for nonstandard instrument procedures.

NOTE: MAJCOMs will send a copy of the waiver package to AFFSA/XOIP and maintain the original package until receipt of approval/disapproval notice. Then return the approval/disapproval notice and original package to the requesting unit.

5.4. DELETED.

5.5. Waiver Requests (Nonstandard Instrument Procedures). A waiver is required to permit deviation from U.S. TERPS criteria, and USAF International criteria as stated in this AFI, for instrument procedures at locations where the USAF has procedure development responsibility and at locations not accepted on the USAF Host Nation Acceptance List that are published loose-leaf or in DoD FLIP. Procedures developed for the USAF by the FAA at domestic civil airports that do not meet U.S. TERPS criteria shall be processed IAW FAA Order 8260.32, paragraph 10.

NOTE: Waivers to criteria can be granted for a period of two years (previous policy allowed for permanent waivers). When there is a continuing need for a waiver that was previously granted on a permanent basis, re-accomplish the waiver and submit it to AFFSA for review and approval.

5.5.1. Document all waiver requests using AF IMT 3980, ***Instrument Procedure Waiver***. Each nonstandard instrument procedure will be processed independently. Do not make reference to other procedures as part of the waiver justification. Use a single AF IMT 3980 to document deviations to criteria and submit this IMT with the procedure package. GPD will automatically output to the export folder a filled waiver form (adobe format) for each non-standard condition, which satisfies this requirement.

5.5.1.1. Complete documentation and supporting data (see **Table 5.1.**) shall accompany the waiver request so reviewing offices can conduct an evaluation without additional research.

5.5.1.2. Units will provide the original procedure package plus two complete copies to the MAJCOM.

5.5.1.2.1. The MAJCOM shall mail one of the copies of the waiver package, with all maps, to HQ AFFSA/XOIP for processing. Faxed or electronically transferred packages will only be accepted after prior coordination with HQ AFFSA/XOIP.

5.5.1.2.2. Electronic versions of the requirements outlined in paragraph **5.5.1.1.**, to include maps, , and the completed, signed, flyability check IMT (faxed or scanned) will be accepted by AFFSA for short notice waiver processing of procedures under the following conditions:

5.5.1.2.2.1. Correspondence from the MAJCOM TERPS OIC or above, with justification for waiver processing without hard-copy documentation, will be included.

5.5.1.2.2.2. The hard copy documentation required in paragraph **5.5.1.1.**, to include maps, overlays, and the flyability check, shall be submitted by the MAJCOM to AFFSA within 3 days from the date the automated package is sent.

5.5.1.2.3. See **Table 5.1.** for package contents.

5.5.1.2.4. See **Figure 5.2.** for processing guidance.

5.5.2. Short-term (less than 30 days) extension requests must be addressed to AFFSA/XO with a copy to AFFSA/XOI and come from the Wing OG/CC or MAJCOM O-6 equivalent. They shall include justification for the short-term extension and impact if disapproved.

5.5.3. Waiver re-validation requests must be received on a new AF IMT 3980 NLT 10 days prior to expiration and shall include the following:

5.5.3.1. Completed AF IMT 3980, Sections 1 through 6.

5.5.3.2. Sections 7 & 8 of the new AF IMT 3980 do not require signatures. Enter "See Previous Waiver" in the comments portion of each section.

5.5.3.3. Copy of previous approval message/letter/AF IMT 3980.

5.5.3.4. Documentation showing the procedure was re-evaluated against the most current criteria and aeronautical data. Submission shall include all segment builds and any manual calculations.

5.5.3.5. Any additional information deemed appropriate.

5.5.4. Original approved waiver and any subsequent re-validation shall be retained with the procedure package.

5.5.5. When waiver processing by HQ AFFSA/XOIP is completed, the requesting MAJCOM will only receive a copy of AF IMT 3980.

5.5.6. When a nonstandard procedure is amended, reprocessing the current waiver is not required unless the amendment directly impacts the basis for the waiver.

5.6. AF IMT 3980*, **Instrument Procedure Waiver***. This IMT is used to request approval of an exception to established instrument procedure criteria. Items 1 through 5 must be answered completely and accurately.

NOTE: GPD will automatically output to the export folder a filled waiver form (adobe format) for each non-standard condition. The text entered into GPD will be used to fill the appropriate blocks of the form. The output form is not editable.

5.6.1. Item 1. **Procedure Name.** Include Airport Name, 4-letter ICAO ID (FTIP only), City, and State or Country.

5.6.2. Item 2. **Specific Directive and Paragraph To Be Waived.** Identify each deviation/violation to criteria (USAF, ICAO or AATCP-1(B)) encountered during procedure development/review. Additionally, document what is creating the violation of criteria (i.e., "AFMAN 11-226(I), Volume 3, paragraph 904. Obstacles #214, 407, 408, and 412-415, penetrate the 7:1 transitional surfaces").

5.6.3. Item 3. **Reason For Waiver (Justification) and Operational Impact, If Not Approved.** Justify the need for the waiver and state the operational impact if the waiver is not approved. When stating the operational impact, be specific (i.e., "Historical weather data shows that Ceilings and Visibility's below 500 feet and 2 miles occur approximately 95 days per year. This translates into the loss of, at approximately 10 sorties a day, 950 sorties per year, seriously degrading our mission readiness and training ability").

NOTE: The fact that a procedure has existed for a number of years does not provide an equivalent level of safety and may not be used as a reason for the waiver justification.

5.6.4. Item 4. **Alternative(s) Considered and Reason For Rejection.** Explain each alternative considered used to eliminate the need for the waiver and state why they were not acceptable.

5.6.5. Item 5. **Equivalent Level of Safety Provided.** An equivalent level of safety ***must*** be established for each criteria deviation included in the waiver request to ensure that flight safety is maintained. An equivalent level of safety can be defined as a compensating measure to insure that the deviation from criteria does not have an adverse effect on the operation of aircraft. An example could be a warning note published on the procedure to have the pilot configure his aircraft for landing at a designated point due to a shorter than standard intermediate segment.

5.6.6. Item 6. **Submitted By.** The procedure specialist that designed/reviewed the procedure should be the submitter.

5.6.7. Item 7. Comments (**MAJCOM TERPS).** The MAJCOM TERPS Office will have the first opportunity to recommend approval or disapprove the waiver request/revalidation (see **5.6.7.2.** and **5.6.8.2.** below).

5.6.7.1. When the waiver is not approved, the reason for disapproval must be stated here.

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

5.6.7.3. The MAJCOM TERPS function OIC, Flight Commander, etc., or higher, shall be the approval/disapproval authority for Item 7.

5.6.7.4. Waiver revalidation requires MAJCOM TERPS coordination and signature.

5.6.8. Item 8. **MAJCOM FLYING OPERATIONS (Stan/Eval) ENDORSEMENT.** This endorsement is required to ensure that the MAJCOM flying personnel have the opportunity to review the waiver request to determine if there is any reason that the waiver should not be approved.

5.6.8.1. When the waiver is not approved, the reason for disapproval must be stated in the "Comments" portion of this item.

5.6.8.2. Waiver revalidation requires MAJCOM Stan/Eval coordination and signature.

5.6.9. Item 9. **HQ AFFSA ACTION.** HQ AFFSA is the final waiver approving authority. When the waiver is not approved, the reason for disapproval will be stated in the "Comments" portion of this item prior to AFFSA returning the IMT to the submitter.

5.7. Deleting Instrument Procedures. When a procedure is no longer required:

5.7.1. The requesting unit informs the responsible TERPS authority that the instrument procedure is no longer needed. (Organizations at any level of command may initiate this action.)

5.7.2. The responsible TERPS authority coordinates with other interested agencies/using organizations (MAJCOM, DoD, FAA, host nation, etc.).

5.7.3. Each agency/organization reviewing the requested deletion determines whether the deletion will adversely impact any known operations.

5.7.4. Ensure concurrence from all interested agencies is obtained prior to deleting the instrument procedure. After each agency/organization concurs with the request:

5.7.4.1. The MAJCOM TERPS office will send a cancellation notice to NGA.

5.7.4.2. The MAJCOM TERPS office will return fix names and identifiers no longer needed to NFDC.

5.8. Special Use Instrument Procedures. A special use instrument procedure is defined as a procedure developed IAW AFMAN 11-226(I) and AFI 11-230 for a unique operational requirement and published by NGA in a "loose-leaf" format only.

5.8.1. Special use instrument procedures must state: "For Use by (organization/exercise/operation) ACFT Only" in the planview.

NOTE: Other aircraft/DoD components may use these procedures only after receiving approval from the MAJCOM/DO, CFACC/JFACC responsible for the development and maintenance of the procedure.

5.8.2. Special use procedures being developed that do not meet applicable TERPS criteria (nonstandard procedures) must be coordinated with HQ AFFSA/XOIP for waiver approval (see paragraph **5.5.**).

5.8.3. Provide AFFSA/XOIP a copy of all published original and each subsequently updated special use instrument procedure (even when just updating the effective dates or amending a note).

Chapter 6

INSTRUMENT PROCEDURE MAINTENANCE

6.1. FLIP Maintenance. MAJCOM TERPS functions will establish a Flight Information Publication (FLIP) maintenance system (checklist, operating instruction, etc.) to track annual audits, AIP changes (at MAJCOMs dealing with host nation instrument procedures), NOTAMs, manual changes to aeronautical and obstacle data, and any related correspondence used to ensure instrument procedures are current and meet applicable criteria.

6.1.1. Annual Audit. The annual audit shall identify and validate the need for each instrument procedure (assuring mission requirements are being met), and ensure that all TERPS waivers are current and comply with paragraph **5.5.**, Waiver Requests (Nonstandard Instrument Procedures). Unit TERPS functions shall conduct an annual audit of all instrument procedures and provide results via written correspondence to the parent MAJCOM NLT 15 September using the AFFSA spreadsheet format (see paragraph **1.3.9.**).

6.1.2. Aeronautical data currency/GPD Automatic Evaluation (Auto Eval). In GPD Data Manager, import updates to aeronautical and obstacle data immediately upon receipt to ensure currency. DAFIF and DVOF are disseminated monthly. DTED and other products are updated as deemed necessary by NGA/NACO. Manual edits are made as necessary based on OE/AAA case studies, new construction, NAVAID changes, host nation AIP changes, NOTAMs, etc. After new data is imported, and/or after manual edits are processed, initiate an Auto Eval check on each saved procedure in every workspace to determine whether data changes have resulted in procedural changes. When Auto Eval indicates a change has taken place, restore the procedure to determine the extent of the revisions and whether terminal amendments are required. When procedural changes are necessary, export the procedure and process an amendment IAW **Chapter 5**.

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. A procedure is 'restored' and re-evaluated based on the current data environment each time it is opened.

6.1.2.1. Each saved procedure shall be restored, evaluated, and saved (not exported) at least once each six months regardless whether Auto Eval has indicated procedural changes or not.

6.1.2.2. Auto Eval is limited to checking those instrument approach and departure procedures that GPD currently supports. Auto Eval does not check ATC charts for changes after data import/revisions. Each saved chart shall be restored after data update/revision, and checked for new sector altitudes/violations.

6.1.3. Foreign Terminal Instrument Procedures (FTIP).

6.1.3.1. Review instrument procedures based on non-accredited host nation source IAW requirements in paragraph **6.1.2.**. Ensure source documentation used is current and that all changes have been documented and published correctly.

6.1.3.2. Review instrument procedures based on accredited and special accredited host nation source whenever new host nation source documentation is received to ensure published procedures and FTIP

reviews are kept current. Re-accomplish the CHECKLIST for REVIEW and/or PUBLICATION of FOREIGN TERMINAL INSTRUMENT PROCEDURES, **Attachment 7**. When required, re-accomplish all ceiling and visibility minima calculations.

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

6.1.3.3.1. Host nation AIP changes/revisions. Compare new information against the old information and against what is currently published in the DoD FLIP or posted on the GDSS.

6.1.3.3.2. US/host nation NOTAMs.

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

6.1.3.5. Maintain as much source information as possible.

6.1.3.6. Whenever possible, perform a full review of host nation source documentation in advance of it's effective date. Notify NGA of any procedural changes to published instrument procedures required prior to the applicable cut-off dates established in FLIP General Planning (GP), Chapter 11, for inclusion in next FLIP cycle. Ensure host nation effective date and DoD effective date coincide.

6.1.3.7. When time permits a full review and host nation changes will be effective before the next DoD FLIP cycle, issue a NOTAM documenting the required changes to the DoD FLIP. Notify NGA of the required changes via TAS Letter and cancel/revise the NOTAM after the changes are published in the DoD FLIP.

6.1.3.8. When a full review is not possible prior to the effective date of the host source, the DoD procedure shall be NOTAM'd "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 re-instate the procedure and cancel the "NOT AUTHORIZED" NOTAM. When the completed review reveals major changes not correctable by NOTAM, keep the procedure "NOT AUTHORIZED" until the corrected depiction appears in the DoD FLIP.

6.1.3.9. Where possible, establish a point of contact (POC) with the host nation to coordinate changes.

6.1.4. The parent MAJCOM TERPS function shall maintain instrument procedures/ATC charts for locations where a unit specialist is not assigned/available. In addition to the requirements of paragraphs **6.1.1.** and **6.1.2.** above, MAJCOMs shall:

6.1.4.1. Fulfill all unit responsibilities IAW **Chapter 1**. Develop and maintain a globalspace, workspace(s) and procedure packages as outlined in paragraph **5.1.8.**.

6.1.4.3. Coordinate with agencies proposing changes to have the effective date of the changes match the effective date of the FLIP cycle that will contain the new version. When changes must be effective before publication in the FLIP, issue the appropriate NOTAM to cover the time between the two dates.

6.1.4.4. Establish a POC at each location with the unit(s) requesting instrument procedure development/changes. The POC must provide the MAJCOM with pertinent changes to the airfield environment. 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. Also, establish a clear avenue of communications to ensure timely reporting.

6.2. Revising Instrument Procedures.

6.2.1. Submit all new standard or special-use instrument procedures (to include civil and/or host nation procedures) and procedural changes (see paragraph **6.2.2.**) to existing procedures to the Aeronautical Safety Division of NGA IAW this AFI 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)." Affect coordination with NGA using the GPD-generated publication form and FLIP graphic depiction.

6.2.2. Those changes affecting any fix, radial, bearing, course, track, altitude, minima, obstacle, holding pattern, climb table, time/distance table, procedure identification, and/or operational note/remark are defined as 'procedural changes'. Changes affecting other items are considered 'non-procedural' changes. Coordinate procedural changes with the original signatory agency/office IAW **Chapter 5** and as noted in paragraph **6.2.3.** below.

NOTE: Airfield Management will normally submit all non-procedural changes according to FLIP GP, Chapter 11. Non-procedural changes do not require processing through original coordinating channels; however, unit TERPS functions shall inform the MAJCOM TERPS office when making non-procedural changes.

6.2.3. Terminal Amendment System (TAS). When procedural changes require the amendment of an instrument procedure, the TERPS specialist will send a TAS letter to NGA. The TAS letter will document each procedural change required to make the instrument procedure compliant with current criteria. Assign a number to each amendment, beginning with the number one and indicate the amendment number in the procedure properties of GPD. Multiple procedural changes may be made in a single amendment. Retain electronic file copies of the original procedure and all prior amendments in the procedure package. All correspondence for processing the procedure will reference the current amendment number. During FLIP review (see paragraph **6.3.**), ensure the amendment number is depicted on the published IAP and so that the flight check pilot can use it to confirm currency of obstacle information.

NOTE: MAJCOM approval responsibility for each amendment is the same as for the original procedure package. All required approval signatures must be obtained for each amendment.

6.2.3.1. Approving Authority Signatures. Forward the GPD-generated publication report with a coordination letter describing the change(s) with applicable instructions to each agency that coordinated on the original package for their endorsement.

6.2.3.2. A NOTAM or a message may be used to make a procedural change. When this option is exercised, notify the applicable MAJCOM of the change. Forward a new or revised package to the MAJCOM within 30 working days.

NOTE: When raising the CMDA on a currently published instrument approach solely to meet floor of controlled airspace (FOCA) requirements, neither a flyability check nor a flight inspection is required. In GPD, annotate in the user defined notes the action taken with supporting rationale.

6.2.4. FTIP. Process revisions to host nation instrument procedures based on *non-accredited* host nation source published in the DoD FLIP and maintained by the USAF IAW paragraph **6.2.1.** above, except coordination with all original signatories is not required for each amendment.

6.2.5. Process revisions to host nation instrument procedures based on *accredited* and *special accredited* host nation source published in the DoD FLIP and maintained by the USAF IAW paragraphs **6.1.3.2.** and **6.2.1.** above except coordination with all original signatories is not required for each amendment.

6.3. Review of FLIP and Other TERPS Related Data (FLIP Review).

6.3.1. Instrument procedures. The initial FLIP review of an original instrument procedure shall be an in-depth validation of the planview, profile, minima block, radar minimums, and airport sketch to ensure the published information mirrors the instrument procedure package and to verify the accuracy of NGA produced FLIP products.

NOTE: Once the initial FLIP review has been completed, subsequent FLIP reviews of the same instrument procedure need not be as 'in-depth' (see paragraph **6.3.1.4.**).

6.3.1.1. Upon receipt of new paper FLIP products and/or update of the NGA web site, the responsible TERPS function shall complete a thorough review of either the paper FLIP version or the corresponding electronic version prior to the effective date of the applicable FLIP.

6.3.1.2. When an error is found on a procedure in one medium, the corresponding procedure in the other medium shall also be reviewed. When errors are found which are procedural in nature (see paragraph **6.2.2.**) and could jeopardize flight safety (regardless of the medium in which the error was made), initiate NOTAM action to either stop use of the procedure or list the corrections required to allow continued use of the procedure.

6.3.1.3. Document the completion of this review in the instrument procedure package on all of the following:

6.3.1.3.1. New procedures. Compare the new product against the procedure package. The possibility for errors is highest in new procedures being published for the first time.

6.3.1.3.2. Changes submitted to existing procedures. Check each procedure for errors when revisions have been submitted to NGA. Ensure the amendment number has been updated and a new Julian date has been assigned to the revised procedure.

NOTE: A change to the Julian date at the top of the plate indicates that either a procedural change or a non-procedural change has been made. Typically, non-procedural changes are made by NGA and are not submitted by the MAJCOM TERPS function.

6.3.1.3.3. All other existing instrument procedures, including RADAR INSTRUMENT APPROACH MINIMUMS and IFR TAKE-OFF MINIMUMS and DEPARTURE PROCEDURES.

6.3.1.4. FLIP reviews on individual instrument procedures conducted after the initial FLIP review (see paragraph **6.3.1.**) may be considered complete when there is no change to the Julian date from the same, previously published, instrument procedure.

NOTE: This in no way negates the requirements to review host nation source for new, revised and/or deleted instrument procedures or to track and follow-up on all applicable NOTAMs and/or TAS letters to NGA.

6.3.1.5. When FLIP review cannot be completed prior to the effective date of the applicable FLIP due to late web posting by NGA and/or delayed delivery of paper copy FLIP, take the following action(s), as appropriate:

6.3.1.5.1. Coordinate with NGA to determine the expected delivery date of the paper copy FLIP or the expected date the electronic version of the instrument procedure will be posted;

6.3.1.5.2. Send a NOTAM extending the effective date of the current FLIP or canceling affected instrument procedures, as applicable;

6.3.1.5.3. Cancel NOTAMs that extended the effective date of the now expired FLIP after the FLIP review has been completed on the current product.

6.3.2. Loose-leaf/locally published FLIP. Review new and/or revised loose-leaf/locally published FLIP IAW paragraph **6.3.1.** on receipt and during annual audit.

6.3.3. Base Civil Engineering Comprehensive Planning Maps/GIS equivalent and or GeoBase Common Installation Picture (CIP) Foundations. Review revised Base Civil Engineering Comprehensive Planning Maps or equivalent to verify changes/new information.

6.3.4. Changes to the airfield. Review planned or completed changes in airfield layout, facilities, lighting, etc. As soon as possible, determine the effect of proposed construction/engineering changes on instrument procedures.

Chapter 7

FOREIGN TERMINAL INSTRUMENT PROCEDURES (FTIP)

7.1. Publication of Foreign Terminal Instrument Procedures (FTIP) under the USAF FTIP Acceptance Program. IAW SECDEF policy, each service has the authority to establish a process that identifies, maintains, and periodically revalidates a list of nations and/or specific airports that meet instrument procedure criteria equivalent to US standards. This AFI and the USAF FTIP Acceptance Program implements the SECDEF policy for the USAF. It provides relief from completing a full manual or automated review on each instrument procedure derived from host nation (locations outside of U.S. jurisdiction) source documentation prior to use by DoD aircrews. By validating the level of reliability and accuracy of selected host nation flight inspection and instrument procedure development and publication practices, military and/or civil host nation instrument procedure programs may be added to the USAF FTIP Acceptance List. Use of the checklist at **Attachment 5** is required to assess the level of acceptability of each host nation program/airport being considered for accreditation. The bulk of the items/data to be assessed is contained within the host nation source documentation, i.e., Aeronautical Information Publication (AIP) data, NOTAMS, Aeronautical Information Circular (AIC) data, FLIP information, airway charts, etc. There are two categories for accepted host nation programs; **special accredited** and **accredited**. Additionally, individual airports may be evaluated for the **special accredited** category. Host nation programs/airports that have not been evaluated and those that do not meet the guidelines set forth in this chapter will not be added to the list. By default, these airports and programs are considered **non-accredited**.

7.1.1. Host nation instrument procedure programs are categorized as special accredited when the USAF has placed a very high degree of confidence in the host's flight inspection practices and instrument procedure development and publication practices. These host nation programs are high quality programs considered equal to our own (FAA/DoD) as determined by the answers to checklist items in **Attachment 5** of this AFI and a review by AFFSA/XOI of supporting documentation provided by the MAJCOM performing the evaluation.

NOTE: When deemed appropriate by MAJCOM TERPS authorities, individual host nation airports may be considered for the special accredited status even though the corresponding host nation instrument procedure program is categorized as accredited or non-accredited. The evaluation and approval process for an individual airport is the same as for a specific instrument procedure program.

7.1.1.1. HQ AFFSA/CC is the approval authority for the special accredited status for both instrument procedure programs and individual airports.

7.1.1.2. Paragraph **7.1.9.** contains guidance for special accredited Category II/III ILS procedures.

7.1.2. Host nation instrument procedure programs are categorized as accredited when the USAF has placed confidence in the host's flight inspection practices and instrument procedure development and publication practices. Final approval authority for this category rests with HQ AFFSA/XOI.

NOTE: Individual host nation airports are not eligible for the accredited status; this category applies only to instrument procedure programs.

7.1.3. The 'default' category for all FTIP is non-accredited. Host nation flight inspection practices, instrument procedure programs, and all associated host nation source documentation, i.e., Aeronautical Information Publication (AIP) data, NOTAMS, Aeronautical Information Circular (AIC) data, FLIP information, airway charts, etc., will be categorized as non-accredited when they have not been considered for evaluation under this program by the MAJCOM TERPS function.

NOTE: Non-accredited instrument procedure programs shall be evaluated using US TERPS or USAF International standards (see **Attachment 9**).

7.1.4. FTIP Acceptance Approval Requirements.

7.1.4.1. The MAJCOM TERPS function will accomplish the following when evaluating candidate instrument procedure programs/airports for acceptance.

7.1.4.1.1. Inform AFFSA/XOIP as early as possible that a host nation instrument procedure program or a host nation airport is being considered for accreditation; include the accreditation status being requested. AFFSA/XOIP, in turn, will request comments from other MAJCOMs, NGA, USAASA, NAVFIG, and FAA (AFS-420 and AVN-160).

NOTE: Only evaluate candidate programs/airports that are within your MAJCOM TERPS AOR.

7.1.4.1.2. Review the FAA *International Flight Information Manual*, FAA *Notices To Airman-Domestic/ International,* and the Foreign Facilities Approved for Category II and Category III Operations on the FAA web site **http://www.faa.gov/avr/afs/afs410/index.cfm** for potential concerns that may discourage acceptance of the candidate program/airport.

7.1.4.1.3. Review the results of the FAA Flight Standards Service International Aviation Safety Assessment (IASA) Program at **http://www.faa.gov/avr/iasa/index.cfm**. The special accredited status *will not be granted* to instrument procedure programs in countries that are rated Category 2 (*do not meet* ICAO Standards) by the IASA program unless adequate justification endorsed at the MAJCOM 3-letter level or above is provided to AFFSA/XOIP. This restriction does not apply to individual host nation airports.

7.1.4.1.4. Notify AFFSA/XOIP of all known host (civil and/or military) declared exceptions to U.S. TERPS/ICAO PANS-OPS/NATO AATCP-1(B) and flight inspection standards when answering **Attachment 5** checklist items A5.6 and A5.7. HQ AFFSA will be the final approval authority for USAF acceptance of exceptions to these criteria.

7.1.4.1.5. Inform the applicable US Defense Attachè Office (USDAO) that a host nation instrument procedure program or a host nation airport is being considered for addition to the USAF FTIP Acceptance List. Request input from that office for concerns that may discourage acceptance of the candidate program/airport.

NOTE: Each country's military and civilian instrument procedure development process must be evaluated separately when each uses different methods or when performed by separate offices.

7.1.4.1.6. Send AFFSA/XOIP a copy of all host AIP/FLIP documentation reviewed, and any correspondence made with host nation officials during the evaluation process. Representative samples of FTIP (approach and departure procedures) shall be submitted versus the entire AIP/FLIP document.

7.1.4.1.7. Complete and submit the **Attachment 5** checklist with the other documentation. All requests sent to AFFSA must be approved and endorsed at the MAJCOM 3-letter level or above before the instrument procedure program/airport is considered by AFFSA for addition to the USAF FTIP Acceptance List.

7.1.4.2. In addition to the requirements in paragraph **7.1.4.1.**, the following requirement shall have been met and the other items shall be accomplished prior to submitting a host nation's civil or military program for the special accredited status.

7.1.4.2.1. The program shall have been categorized as accredited on the USAF FTIP Acceptance List for a minimum of 24 months.

7.1.4.2.2. The MAJCOM TERPS function shall review documentation (i.e., instrument procedure packages and associated correspondence) concerning the accredited host program for the previous two years for potential concerns that may discourage granting the special accredited status to the program by AFFSA. The data reviewed shall be representative of both small and large airports.

7.1.4.2.3. A site visit (not an inspection) by representatives from the MAJCOM TERPS function to the host's procedure development office shall be conducted to review and document their flight inspection practices, procedure development standards, and publication practices.

7.1.4.3. The request to special accredit an instrument procedure program shall include documentation that all requirements in paragraphs **7.1.4.1.** and **7.1.4.2.** have been met and must be approved and endorsed at the MAJCOM 3-letter level or above. When any of the requirements in **7.1.4.2.** cannot be met, include in the request rationale for submitting the program for special accredited status without meeting the requirement(s). HQ AFFSA/CC will make the final decision based on provided rationale.

7.1.4.4. Individual host nation airports may be evaluated/approved for special accredited status separately from that nation's instrument procedure development program. In addition to the requirements in paragraph **7.1.4.1.** (see exception in paragraph **7.1.4.1.3.**), the MAJCOM TERPS function will accomplish the following prior to submitting an airport for the special accredited status.

7.1.4.4.1. A site visit (not an inspection) to the airport's instrument procedure development office shall be conducted to review and document the flight inspection practices, procedure development standards, and publication practices specific to that airport.

7.1.4.4.2. Historical data for the past two years reference the primary instrument runway(s) for precision/non-precision approach procedures and for departure procedures shall be evaluated for potential concerns that may discourage acceptance of the airport.

7.1.4.5. The request to special accredit an individual host nation airport shall include documentation that all requirements in paragraphs **7.1.4.1.** and **7.1.4.4.** have been met and must be approved and endorsed at the MAJCOM 3-letter level or above. When either of the requirements in **7.1.4.4.** cannot be met, include in the request rationale for submitting the airport for special accredited status without meeting the requirement(s). HQ AFFSA/CC will make the final decision based on provided rationale.

7.1.5. Maintaining FTIP Acceptance Approval.

7.1.5.1. To ensure all standards continue to be met and for programs/airports to remain accepted, the MAJCOM TERPS function shall re-evaluate programs and airports on a biennial basis. This re-evaluation may be conducted at any time during the two years from the date of initial acceptance by AFFSA.

NOTE: A 30-day extension beyond the 2-year period for accredited programs may be requested from AFFSA/XOI. A 60-day extension beyond the 2-year period for special accredited programs and airports may be requested from AFFSA/CC. Extension requests shall be received at AFFSA at least 10 days prior to acceptance approval expiration. Include rationale that has been approved and endorsed at the MAJCOM 3-letter level or above with each extension request.

7.1.5.1.1. Re-accomplish the **Attachment 5** checklist.

7.1.5.1.2. Perform a 're-validation' visit to special accredited programs and airports IAW paragraph **7.1.4.4.**. Failure to conduct and document the 're-validation' visit to special accredited programs and airports within the timeline specified coupled with no request for an extension (see paragraph **7.1.5.1.*NOTE***) will justify immediate revocation of this status by HQ AFFSA/CC.

NOTE: Site visits are not required when submitting a host nation's program for the accredited status or when re-validating accredited programs.

7.1.5.1.3. Monitor the FAA IASA Program for changes to a country's category status.

7.1.5.1.3.1. When AFFSA has granted special accredited status to a country's military or civil program and the country no longer meets ICAO standards IAW the IASA Program, the responsible MAJCOM shall notify AFFSA/XOIP and recommend either downgrading the program or keeping the program special accredited.

7.1.5.1.3.2. Adequate justification endorsed at the MAJCOM 3-letter level or above is required to keep the program special accredited. AFFSA will make a determination based on a review of the MAJCOM's submission.

7.1.5.1.4. Forward the results of the re-evaluation to AFFSA/XOIP for review. Include a recommendation for the program/airport to either retain the current status, or for it to be upgraded or downgraded, as applicable. AFFSA will make a determination based on a review of the MAJCOM's submission.

7.1.5.2. After a host nation's program/airport is granted accreditation and the MAJCOM becomes aware of a condition that would have precluded the initial approval of either status, take the following actions;

7.1.5.2.1. Special accredited programs/airports.

7.1.5.2.1.1. Notify AFFSA/XOIP of the new condition/change(s) to the host nation program. Individual airports will be removed from the USAF FTIP Acceptance List and programs will be downgraded one category to the accredited status by AFFSA.

7.1.5.2.1.2. NOTAM all affected instrument procedures "Not Authorized" until the appropriate review is completed and either an amended NOTAM is issued or the N/A NOTAM is rescinded.

7.1.5.2.1.3. Perform the appropriate TERPS review IAW **Figure 7.1.** based on the downgrade on all affected instrument procedures.

7.1.5.2.1.4. Pursue all required waiver actions on procedures now based on non-accredited source.

7.1.5.2.2. Accredited programs.

7.1.5.2.2.1. Notify AFFSA/XOIP of the new condition/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 status. Based on the MAJCOM recommendation and an evaluation by AFFSA/XOIP, AFFSA/XOI will either approve the request to retain the accredited status or remove the program from the USAF FTIP Acceptance List.

7.1.5.2.2.2. NOTAM all instrument procedures downgraded to non-accredited as "Not Authorized" until the appropriate review is completed and either an amended NOTAM is issued or the N/A NOTAM is rescinded.

7.1.5.2.2.3. Perform a complete TERPS review IAW **Figure 7.1.** based on the downgrade on all affected instrument procedures.

7.1.5.2.2.4. Pursue all required waiver actions on procedures now based on non-accredited source.

7.1.5.3. AFFSA/XOIP responsibilities under the USAF FTIP Acceptance Program.

7.1.5.3.1. Review and evaluate all MAJCOM provided documentation pertaining to requests for initial accreditation of candidate programs/airports and all subsequent biennial re-evaluations of candidate programs/airports.

7.1.5.3.2. Maintain and distribute the USAF FTIP Acceptance List. This list documents host nation instrument procedure program status (distinguishing between civil and military) that the USAF has reviewed and approved as ‘accredited’ or ‘special accredited’. It also lists AFFSA/CC approved ‘special accredited’ airports.

NOTE: The USAF FTIP Acceptance List shall not be forwarded/distributed/given to any agency outside of the USAF without prior written approval from AFFSA/XOI.

7.1.5.3.3. Inform the NAVFIG, USAASA, and FAA of completed FTIP acceptance actions.

7.1.5.3.4. Notify the appropriate MAJCOM TERPS function whenever it becomes aware of changes to the status of approved host nation instrument procedure programs, AIPs, and IAPs, or when the country no longer meets ICAO standards IAW the FAA IASA Program.

7.1.5.3.5. Make the appropriate recommendation to AFFSA/XOI and AFFSA/CC for approval or disapproval of accreditation requests.

7.1.6. Publishing FTIP in the DoD FLIP. When requesting publication of a foreign instrument procedure in the DoD FLIP, the requestor/requesting unit should include a copy of the Foreign Terminal Instrument Procedure (FTIP) or clearly identify the required procedure in the request. MAJCOMs shall process requests for publication of FTIP in the DoD FLIP IAW the following (see **Figure 7.2.**):

7.1.6.1. Select instrument procedures to be published in DoD FLIP to satisfy DoD requirements at foreign locations where a US Government agency is not responsible for instrument procedure development, provided:

7.1.6.1.1. The instrument procedure is published in an international AIP or acquired as the result of a written agreement. This agreement may be between the MAJCOM and the applicable host nation air Attachè Office (USDAO), local USAF flying organization, or host nation aviation authority. This agreement shall insure that the MAJCOM is informed of changes or revisions made by the host nation as they occur.

NOTE: The only approved sources for translating information/instrument procedures obtained from an AIP not published in English are NGA, a qualified translator on the MAJCOM TERPS staff, or the US Air Attachè office (USDAO) located in the country where the instrument procedure is located.

7.1.6.1.2. An international aeronautical information service (NOTAMs, etc.) is available for the procedure.

7.1.6.1.3. The procedure can be safely flown, as depicted or explained, using US Air Force instrument flight procedures contained in AFMAN 11-217, *Instrument Flight Procedures*, and other applicable directives.

7.1.6.2. Coordinate with host nation aviation and/or instrument procedure authorities:

7.1.6.2.1. For approval to publish new, USAF developed, instrument procedure(s) when existing host nation procedures do not meet operational requirements or when the host does not publish.

7.1.6.2.2. When altering an existing FTIP, except for higher ceiling and visibility minima, higher emergency safe altitudes, higher minimum safe altitudes, or other changes permitted by an established agreement with the host nation, or as stated in this chapter.

7.1.6.3. FTIP to be published in the DoD FLIP that are based on non-accredited host nation source, must have a complete TERPS evaluation (either manual or automated) of all segments (including holding, minima, and minimum sector altitudes) done by the MAJCOM prior to use.

7.1.6.4. Initiate waiver action IAW paragraph **5.5.** for criteria violations to accepted standards on instrument procedures based on non-accredited host nation source.

7.1.6.4.1. In situations where the rounding places the radial published in the DoD FLIP outside the straight-in criteria parameters, the procedure does not meet straight-in criteria and a straight in approach is not authorized without a waiver.

7.1.6.4.2. Publication of circling minima only (in lieu of straight-in minima) does not eliminate the need to obtain a waiver for nonstandard straight-in final approach course alignment.

NOTE: Instrument procedures based on accredited or special accredited host nation source and FTIP at special accredited airports listed on the USAF FTIP Acceptance List do not require waiver action for any deviation to accepted standards.

7.1.6.5. Coordinate with the requesting agency and appropriate air traffic control units, as required.

7.1.6.6. Plan the operational date for new procedures to coincide with the FLIP General Planning (GP), Chapter 11, *Revision Schedules*. When this is not possible, the following note shall be published on the approach/departure plate: "Effective by NOTAM". Do not use this caveat for more than 90 days. See AFJMAN 11-208, *Department of Defense Notice to Airmen [NOTAM] System,* for additional NOTAM guidance.

7.1.6.7. Ensure all applicable USAF IMTs and FAA forms are completed to the maximum extent possible.

7.1.6.8. Ensure all requests for publication sent to NGA conform to requirements in this AFI and to paragraph 5 of the "Working Agreement Between NIMA [sic] and DoD Flight Information Coordinating Committee (FCC) On Processing Foreign Terminal Instrument Procedures (TERPS)."

NOTE: IAW paragraph 3d of the Working Agreement, when NGA has a problem publishing any part of any host nation procedure requested by the MAJCOM TAS letter, AFFSA/XOIP will determine whether or not the item is required for safe implementation of the instrument procedure in the DoD FLIP. When

the determination is made that the data is required as published by the host, AFFSA/XOIP will direct NGA to publish per the MAJCOM TAS letter as a Special Military Request (SMR).

7.1.6.9. Do not alter FTIP identification.

NOTE: When the identification differs from AFMAN 11-226(I), Volume 1, paragraph 161 criteria, document the intent of the procedure in the remarks section of the AF IMT 3637; i.e., "The host nation identifies this FTIP as "TACAN/ILS R-35" but only provides ILS final approach guidance and minima." In this example, publish "NOT AUTHORIZED" in the S-TAC-35 minima block.

7.1.6.10. Publish all FTIP warning and caution notes.

NOTE: When host nation notes are confusing or when translating the host nation language into English, use good judgment. Ensure these notes are clear and make sense prior to publishing in DoD FLIP.

7.1.6.11. Publish all FTIP procedural restrictions.

NOTE: Some FTIP documentation is located in the host AIP; not directly on the instrument procedure. Research of host AIP and other host documentation may be required to make the DoD published instrument procedure present a complete and accurate representation of the FTIP.

7.1.6.12. Establish and publish minimum safe/sector altitudes and emergency safe altitude no lower than altitudes specified by the host nation. Addition of an emergency safe altitude requires prior approval from the host nation.

NOTE: Combine sectors on nonstandard host nation MSAs when required to meet DoD/IACC publication specifications.

7.1.6.13. Identify and publish *all* host nation IAFs. When the host does not publish an IAF, or when unable to determine IAF intent from host nation documentation, coordinate with host nation TERPS authorities to establish an IAF prior to publication in the DoD FLIP.

NOTE: NGA requires all IAFs to be identified to provide FMS programming capability.

7.1.6.14. State FTIP published alternate minimums verbatim unless the DoD procedure is annotated "NOT FOR CIVIL USE." In those cases, do not publish alternate minimums.

7.1.6.15. Include FTIP feeder routes and associated data/altitudes. Addition of a route or establishing a minimum flight altitude requires host nation approval.

7.1.6.16. Publish FTIP circling restrictions.

7.1.6.17. Add VDPs only if specifically requested by the proponent and the host approves.

7.1.6.18. NAVAIDs and holding patterns that have been identified on the FTIP that are not part of the procedure shall be depicted on the DoD procedure plate.

NOTE: Host nation ATC may require use of these NAVAIDs by DoD aircrews.

7.1.6.19. When the FTIP (source) depicts a time/distance table, it shall be depicted on the DoD procedure even when DME is required for the procedure. This provides timing 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:

7.1.6.19.1. Convert distances expressed by the host in statute miles or kilometers to nautical miles; round this converted distance to the nearest tenth of a nautical mile and publish the rounded value.

7.1.6.19.2. Whether the host publishes a time/distance table from the FAF or from a step down fix to threshold, determine where the missed approach point (MAP) is located. Develop the time/distance table based on the FAF to MAP distance or the step-down fix to MAP distance, as appropriate.

7.1.6.19.3. When the host has published multiple step-down fixes, develop the time/distance table from the step-down fix nearest the MAP.

7.1.6.19.4. Develop and publish the flying time in minutes and seconds from FAF to MAP or from step down fix to MAP, as applicable.

7.1.6.20. When reviewing data on the FTIP, compare the data to what is also published on area and enroute charts. Look for discrepancies in altitudes or common fix locations that should be the same on all sources. When differences are found, coordinate with host nation authorities to determine the correct information.

NOTE: Nonstandard host nation source (host nation source received from non-host nation sources/officials, i.e., USDAO, local USAF military officials, etc.) shall be treated as non-accredited with the following exception: when procedures to ensure nonstandard host nation source is updated and forwarded to the MAJCOM TERPS authority are established and outlined in a MOU/MOA between US officials at or representing the host nation location and the applicable MAJCOM IAW **7.1.6.1.1.**.

7.1.7. FTIP Holding Pattern Evaluation.

7.1.7.1. When evaluating holding patterns and the maximum holding altitude cannot be determined, evaluate the holding pattern to the ESA altitude or 10,000 feet above the published minimum holding or Initial Approach Fix (IAF) altitude, whichever is greater.

7.1.7.1.1. When this altitude indicates a change to the host nation holding pattern, lower the selected maximum holding altitude and re-evaluate.

7.1.7.1.2. Continue this process until the selected altitude allows use of the holding pattern as published on the FTIP and publish the validated maximum holding altitude on the DoD FLIP.

7.1.7.2. A maximum holding altitude determination is not necessary for FTIP based on accredited and special accredited host nation source unless the review identifies a need to determine one.

7.1.7.3. Only publish the maximum holding altitude when required to ensure separation from obstacles.

7.1.8. Publishing FTIP Missed Approach Procedures.

7.1.8.1. When a host nation publishes more than one missed approach, all of them shall be published on the DoD FLIP.

7.1.8.2. When a host nation publishes a missed approach procedure/instructions for radar procedures, publish them in the "Radar Instrument Approach Minimums" section in the FLIP (Terminal).

7.1.9. ILS Category II/III Procedures.

7.1.9.1. Foreign nation Category II/III ILS procedures approved by the FAA are posted on the FAA AFS-410, Flight Operations Branch, web site: **http://www.faa.gov/avr/afs/afs410/catbbs.cfm**.

NOTE: 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 at the same location.

7.1.9.2. Category II/III ILS FTIP that have been approved by the FAA on the FAA AFS-410 web site may be reviewed and/or published under the guidelines established in this AFI for instrument procedures based on special accredited host nation source *even though the Category II/III procedure may be located in an accredited or non-accredited location*.

7.1.9.3. Category II/III ILS FTIP *not on the FAA AFS-410 web site* are subject to the review and/or publication requirements associated with FTIP based on accredited or non-accredited host nation source, as applicable.

7.1.10. TERPS Review of FTIP. This review is done to determine whether or not an FTIP is safe and accurate and whether or not it conforms to accepted standards. The TERPS review may be done using any one of the accepted standards; U.S. TERPS, ICAO PANS-OPS, or USAF international criteria (see **Attachment 9**). When the review reveals non-compliance with the selected standard, the reviewer must document the deviations on the review. Determine what action (normally some type of caution note) is necessary, if any, to compensate for each deviation.

7.1.10.1. TERPS review of FTIP based on accredited host nation source shall be conducted IAW **Attachment 7**.

7.1.10.1.1. USAF GPD software may be used in conjunction with the checklist at **Attachment 7**.

NOTE: The USAF International criteria set of GPD may be used to evaluate FTIP developed with ICAO criteria.

7.1.10.1.2. Evaluation of obstacles for Required Obstacle Clearance (ROC) is not required.

7.1.10.1.3. The checklist or the AF IMT 4333 must be signed and dated by the procedure specialist conducting the review.

7.1.10.1.4. Review the applicable host nation AIP/FLIP products to determine if departure procedures have been established for obstacle avoidance. When a departure procedure has been established, provide this information to the requester. When the host has not established a diverse (omnidirectional) departure or when diverse departure information is not available, notify the requester that a diverse departure evaluation was not accomplished and that a diverse departure will not be authorized.

NOTE: When the airfield does not have a departure procedure and it appears to be located in an obstacle rich environment, consider developing an appropriate workspace to accomplish a diverse departure (omnidirectional) assessment using USAF GPD.

7.1.10.2. TERPS review of FTIP based on non-accredited host nation source (use of USAF GPD is mandatory when the procedure/segment type is supported).

7.1.10.2.1. Evaluation of obstacles for ROC is required in each segment of the instrument procedure.

7.1.10.2.2. FTIP to be reviewed for a specific mission/exercise/operation must have a complete TERPS evaluation (either manual or automated) of all segments (including holding, minima, and minimum sector altitudes) done by the MAJCOM prior to use.

7.1.10.2.2.1. The AF IMT 4333 must be signed and dated by the procedure specialist conducting the review.

7.1.10.2.2.2. When a visual segment evaluation identifies penetrations to the 20:1 OIS that are not lighted, identify them to the requester (include the amount of penetration) in the review letter for consideration to limit procedure use to daylight operations only to the affected runway (see paragraph **7.5.2.5.3.**).

7.1.10.2.3. When instrument procedures based on non-accredited host nation source do not conform to the selected standard, the reviewer must document the deviations on the review.

7.1.10.2.4. Determine whether or not the final approach course radial published on the FTIP meets straight-in criteria and document any violations to straight-in criteria in the review.

7.1.10.2.5. When conducting the TERPS review on instrument departure procedures include the requirements of paragraph **7.1.10.1.4.** above. Additionally, a diverse (omnidirectional) departure obstacle assessment shall be accomplished. When penetrations are found and the host nation has not published an obstacle driven departure procedure, advise the requester of the finding.

7.1.10.2.5.1. Provide a diverse (omnidirectional) departure to avoid the penetration(s) or

7.1.10.2.5.2. Publish the note: "Diverse departure not authorized".

7.1.10.3. Take the following actions when conducting the TERPS review:

7.1.10.3.1. Review the FAA *International Flight Information Manual* and FAA *Notices To Airman-Domestic/ International* for potential concerns that may discourage use or acceptance of FTIP at the requested location.

7.1.10.3.2. Use USAF GPD to the maximum extent possible. Use DVOF and/or DTED Level 1 (or higher). Full DTED coverage must be available; i.e., no missing cells for any part of any segment of the instrument procedure. The use of digital map products (CADRG , etc.) is authorized to validate controlling obstacles.

7.1.10.3.3. When conducting a manual evaluation, take care to ensure terrain lines and obstacles on the border of the trapezoids are considered when the "segment review" method is used (without a MOC developed). It is not necessary to develop a Master Obstruction Chart (MOC) covering a 100 NM radius when conducting the TERPS review.

7.1.10.3.4. Use the appropriate scale paper map for each segment of the procedure as defined in **Table 7.1.**, when available. Use the next lowest map scale when the scale required is not available.

Table 7.1. MAP Scales Required (Review or Publication)

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 – 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

NOTE: Adverse assumption for vegetation shall be applied as appropriate when using DTED and map products. Printed/plotted NGA Compressed Arc Digitized Raster Graphics (CADRG) maps shall not be used in-lieu-of the appropriate scale paper map for manual evaluations.

7.1.10.3.5. Document in the TERPS review letter when deviating from map scale requirements established in **Table 7.1.**. Include the map scale required, the map scale used, and the vertical and horizontal accuracy of the map that was used in the evaluation of the FTIP.

7.1.10.3.6. Flyability checks.

7.1.10.3.6.1. When the appropriate scale paper map products outlined in **Table 7.1.** do not exist or are not available to evaluate a segment(s) in a timely manner, *and* when DVOF and/or DTED Level 1 (or higher) are not available, the flyability check shall be performed in day VMC prior to being used under IMC conditions.

NOTE: When either the appropriate scale paper maps *or* DVOF/DTED are available, a flyability check is not required.

7.1.10.3.6.2. Ensure all segments that have *not* been evaluated using the appropriate scale paper product are assessed during the flyability check. Conversely, when a 1:500,000-scale map was available and used to evaluate the holding pattern, it would not be necessary to fly the holding pattern during the flyability check.

NOTE: See paragraph **7.1.9.** for Category II/III instrument procedure guidance.

7.1.10.3.7. Document completed reviews IAW the standard format outlined in the Memorandum of Understanding (MOU) established by HQ AMC. Include appropriate comments when a procedure does not meet recognized obstruction clearance and/or when flight inspection abnormalities are known to exist. Forward all completed reviews to HQ AMC/A36AT for posting to the GDSS. The MAJCOM conducting the review shall be responsible for maintaining review currency and informing the requester when changes are required.

7.1.10.4. Reviewed FTIP will receive continuous maintenance IAW paragraph **6.1.3.2.** while the review remains effective. If the FTIP has been sent to NGA for publication, MAJCOM approval authority and the review effective date may extend up to the anticipated publication date in the appropriate FLIP. Specify an expiration date or the anticipated publication date in the review.

7.1.10.4.1. When maintenance of the reviewed procedure has been stopped for any reason, and a new request for use of the FTIP is received, the review must be re-accomplished.

7.1.10.4.2. When subsequent/additional requests for a procedure review are made and maintenance has been continuous, the procedure does not have to be reviewed again. For example: when a procedure will be required for an extended period of time or is awaiting publication, and request(s) come in for a review, the process ***does not*** have to be re-initiated; the current review may be used to satisfy the new request.

7.1.10.4.3. When the requested procedure is in another MAJCOM's TERPS AOR, the MAJCOM that conducted the original or current review retains maintenance responsibility until the operation/exercise expires or until maintenance responsibility is transferred.

7.1.10.5. When more than six reviews over a 12 month period are required at the same location, the MAJCOM TERPS function responsible for that location should take steps to publish the required procedures from that location in DoD FLIP.

7.1.11. FTIP Departure Procedure Validation.

7.1.11.1. When publishing FTIP (approaches or departures) in the DoD FLIP, determine whether or not the host nation has established obstacle driven departure procedures for the location. When it is deter-

mined that the host nation has established obstacle driven departure procedures, publish the host nation departure procedures in the "IFR Take-Off Minimums and (Obstacle) Departure Procedures" (T) section IAW paragraph **3.3.**.

NOTE: Document USAF developed departure procedures at host nation locations on AF IMT 3634, ***Departure Procedure (DP)***. These procedures are subject to the flyability check and flight inspection requirements stated in paragraph **7.3.**.

7.1.11.2. Use the following guidelines when publishing departures based on accredited and special accredited host nation source.

7.1.11.2.1. Review the applicable host nation AIP/FLIP products to determine if departure procedures have been established for obstacle avoidance.

7.1.11.2.2. When there are no departure procedures published in the AIP and it is not possible to determine whether or not a diverse departure is permitted, annotate each procedure with the T and publish "Diverse Departures Not Authorized" in the "IFR Take-Off Minimums and (Obstacle) Departure Procedures" section.

7.1.11.2.3. When an ATC departure procedure is published in the AIP and it is intended to be used as the only departure procedure for obstacle avoidance, annotate each procedure with the T and publish "Rwy XX, Use (NAME of DP/SID) for Obstacle Avoidance" in the "IFR Take-Off Minimums and (Obstacle) Departure Procedures" section.

7.1.11.3. Use the following guidelines when publishing departures based on non-accredited host nation source.

7.1.11.3.1. In addition to the requirements of paragraph **7.1.11.2.**, a diverse departure obstacle assessment shall be accomplished. When penetrations are found and the host nation has not published an obstacle driven departure procedure, advise the host nation of the finding(s), establish a climb gradient for the appropriate departure quadrant to avoid the penetration(s), and establish a departure procedure package.

7.1.11.3.2. When there are no departure procedures published in the AIP and it is not possible to determine whether or not a Diverse Departure is permitted, annotate each procedure with the T and publish "Diverse Departures Not Authorized" in the "IFR Take-Off Minimums and (Obstacle) Departure Procedures" section.

7.1.11.3.3. When an ATC departure procedure is published in the AIP and it is intended to be used as the only departure procedure for obstacle avoidance, annotate each procedure with the T and publish "Rwy XX, Use Published DP/SID for Obstacle Avoidance" in the "IFR Take-Off Minimums and (Obstacle) Departure Procedures" section.

7.1.12. Departure End of Runway (DER) Crossing Restrictions. When evaluating FTIP DER crossing restrictions (‘screen heights’) for either publication or for a TERPS review, do not approve for use a ‘screen height’ lower than published by the host without first obtaining approval from the appropriate host nation aviation officials.

7.1.13. FTIP Package Content.

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

7.1.13.1.1. A copy of the applicable correspondence requesting the procedure;

7.1.13.1.2. A copy of the cover letter with instructions to NGA for publication;

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

7.1.13.1.4. A copy of all approach minima calculations when the host minima is incomplete or not published on the host approach procedure.

NOTE: Include minima computations (showing DA/MDA/CMDA, HAT/HAA, ceiling and visibility value computations) in the procedure package. Nonprecision computations may be documented on the reverse side of AF IMT 3640. Do not send computation sheets to NGA. Include notations when sources of obstacle data, computed values, and nonstandard criteria can cause misunderstanding by reviewing levels.

7.1.13.1.5. A procedure log to track amendments/reviews and any other actions taken.

7.1.13.1.6. A copy of each NGA produced procedure plate beginning with the original.

7.1.13.1.7. A graphic depiction of the instrument procedure other than the NGA produced plate.

NOTE: After the FTIP is published in the DoD FLIP, the planview and profile from the DoD FLIP shall be used to assist in illustrating changes being submitted to NGA as an amendment.

7.1.13.2. In addition to the documentation requirements in paragraph **7.1.13.1.**, document and maintain instrument procedure packages for FTIP based on accredited host nation source by including, at a minimum, the following:

7.1.13.2.1. A completed *Checklist for Review or Publication of Foreign Terminal Instrument Procedures* (see paragraph **7.1.10.**);

7.1.13.2.2. Flyability check documentation (see paragraph **7.3.**).

7.1.13.3. In addition to the documentation requirements in paragraph **7.1.13.1.**, document and maintain instrument procedure packages for FTIP based on non-accredited host nation source IAW **Chapter 5**, **Table 5.1.**.

NOTE: Minima computations may be completed by USAF GPD and need not be documented separately.

7.2. Aircrew Use of FTIP Not Published In U.S. Government (DoD or FAA) FLIP. IAW AFI 11-202, Volume 3, *General Flight Rules*, Chapter 8, MAJCOM TERPS offices must review instrument approach and departure procedures not published in a DoD or FAA FLIP (see **Figure 7.2.**). IAW AFI 11-202, Volume 3, *General Flight Rules*, Chapter 8, paragraph 8.3.1.2., this review may be waived by the MAJCOM/DO, JFACC/CFACC, or equivalent (see paragraph **7.2.7.**).

7.2.1. In cases where the requesting authority has no TERPS function and the TERPS review is performed by a USAF TERPS authority outside of the requesting authority's chain of command, the Operational Risk Management (ORM) decision(s) and approval to use the FTIP shall be obtained from the requesting MAJCOM flying operations authority, CFACC/JFACC, or the command authority exercising operational control of the mission aircraft after the review is completed. The requesting MAJCOM or MAJCOM equivalent flying operations authority (CFACC/JFACC) shall determine the specific office in their chain of command in which this authority is vested (not the MAJCOM that performs the TERPS review).

7.2.2. MAJCOMs shall establish methods for review requests to be directed to the MAJCOM TERPS function. The MAJCOM TERPS function should check the HQ AMC Global Decision Support System

(GDSS) and/or coordinate with other MAJCOMs to determine if a review of the procedure has already been accomplished.

7.2.2.1. When required procedures are based on special accredited host nation source, a review of the procedures is not required when using the host government sanctioned FLIP. However, when the MAJCOM receives a request to review a commercial FLIP (e.g., Jeppesen, etc.) based on special accredited host nation source, a comparison review shall be conducted (see paragraph **7.2.6.**).

7.2.2.2. Reviews shall be completed and forwarded to HQ AMC/A36AT IAW the MOU on Disseminating FTIP Information via AMC GDSS for posting to the GDSS (**https://www.afd.scott.af.mil/cgi-bin/LCUTL/afd.exe**).

7.2.3. The MAJCOM TERPS function responsible for conducting the review should receive a review request at least 7 duty days prior to date of anticipated use. The request shall consist of at least the following:

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

7.2.3.2. The airport name(s).

7.2.3.3. The names and/or types of instrument procedures required. The requester shall be responsible for identifying all instrument procedures to be reviewed. This information can be obtained from the applicable nation's AIP or terminal FLIP product, Jeppesen product, etc. The request shall indicate the specific volume, section, page number, and date.

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

NOTE: It is important to have the mission aircraft's navigational equipment capability identified in the request to eliminate reviews on instrument procedures that could not be flown.

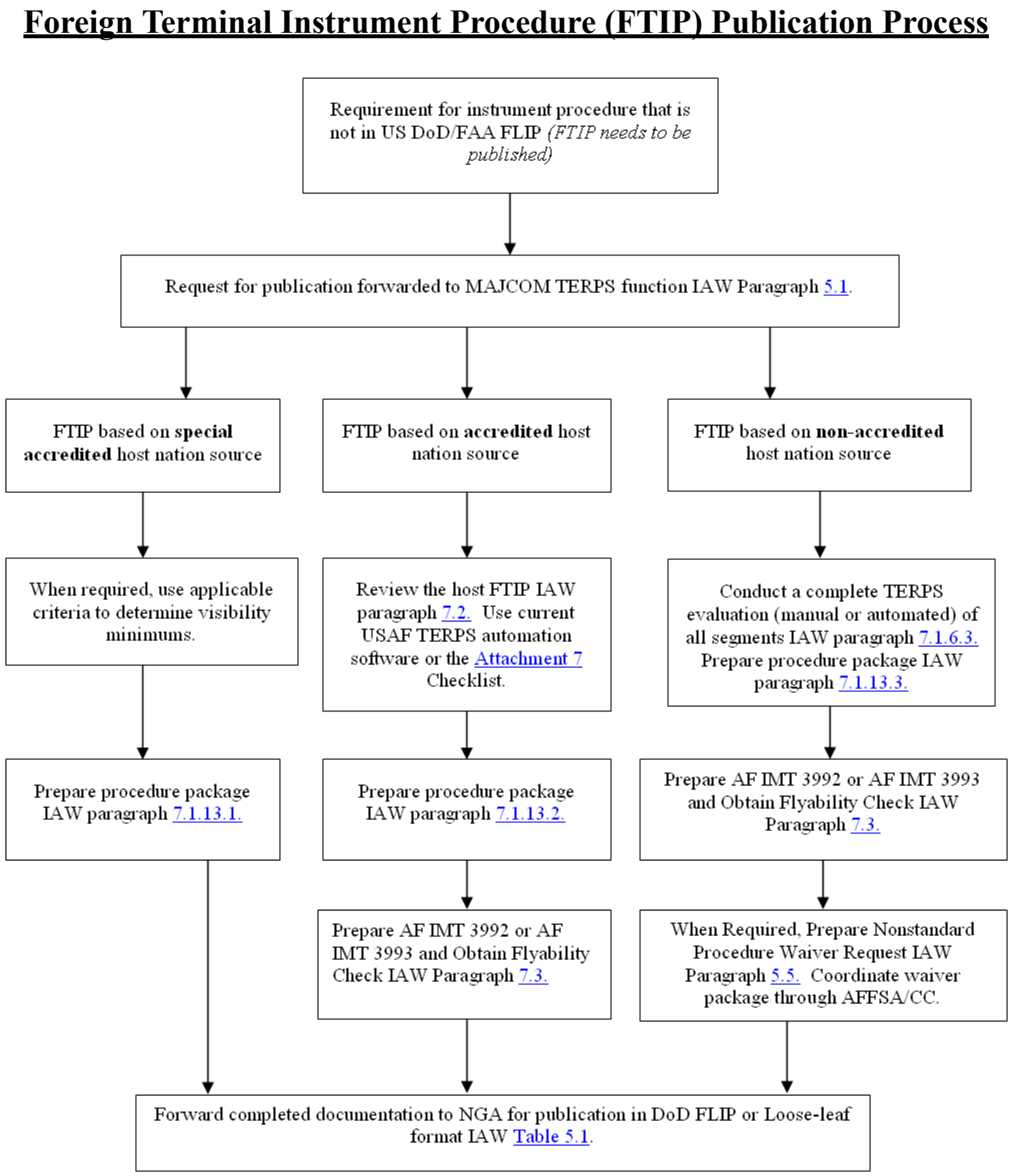
7.2.4. When the required instrument procedures are not posted on the GDSS or when a posted review has expired, aircrews should request a review or an updated review from the appropriate MAJCOM. When a MAJCOM requiring a procedure review requests review responsibility from another MAJCOM, it may be delegated to them.

7.2.5. IAW SECDEF policy, USAF aircrews may use special accredited, host nation published (host government sanctioned AIP, terminal FLIP product, etc.) instrument procedures without a TERPS review by the MAJCOM.

7.2.6. Comparison review. A comparison review is a 'corner-to-corner' review between a commercially produced product (e.g., Jeppesen, etc.) and the corresponding host nation product. When the user requests a review of any commercially produced instrument approach or departure procedure that supports any host nation location, the MAJCOM TERPS function shall also review the corresponding host nation produced product if not currently published in the DoD FLIP, prior to USAF aircrew use of the commercial product. The review of the host nation product constitutes the TERPS review and shall be conducted prior to the comparison review.

7.2.7. The TERPS review may be waived when the procedure is required for operations defined as an urgent requirement to fly short notice, humanitarian, contingency, MEDEVAC, "special" access and urgent State Department missions.

Figure 7.1. FTIP Publication Process



7.2.7.1. The applicable MAJCOM/DO, JFACC/CFACC, or equivalent may waive the TERPS review. When this authority's grade is below O-8, the waiver authority will lie with the first O-8 or above in the operational chain of command with responsibility for mission risk assessment. This waiver authority will not be further delegated.

7.2.7.2. When this waiver authority is exercised, MAJCOMs will ensure the aircrew and applicable MAJCOM TERPS office is notified that authorization has been given to use the procedure without review.

7.3. FTIP Flyability Check/Flight Inspection Requirements for Publication in DoD FLIP.

7.3.1. An actual (live) flyability check, flown IAW paragraph **8.1.**, shall be accomplished prior to publication unless any one of the requirements in paragraphs **7.3.1.1.**, **7.3.1.2.**, or **7.3.1.3.** is met.

7.3.1.1. Procedure is based on accredited or special accredited host nation source.

7.3.1.2. A US FAR Part 121 air carrier routinely serves the location. Contact the US air carrier to determine if special restrictions have been established for operating at this airport. The results of this inquiry will be documented in the remarks section of the AF IMT 3634, ***Departure Procedure (DP)*** or AF IMT 3637, ***Instrument Approach Procedure*** in the procedure package or in a memorandum when the procedure package does not contain either IMT. When the air carrier has established restrictions, the MAJCOM will obtain and evaluate these restrictions to determine whether or not they should be applied to the DoD procedure (FAA Order 8260.31 requires air carriers to provide this information to the Air Force). Document instances when the air carrier does not respond or refuses to divulge information and contact AFFSA for assistance. When publication of the procedure is required prior to resolution by AFFSA, a flyability check is required.

7.3.1.3. The FAA has flight inspected the instrument procedure. A copy of this flight inspection report will be considered an acceptable substitute for AF IMT 3992, ***Approach Flyability,*** or AF IMT 3993, ***Departure Flyability*** and shall be maintained with instrument procedure package.

NOTE: The flight inspection report must specifically state "SIAP verified IAW Order 8200.1A, USSFIM, Section 214.31" or the "SIAP Verified" block must be checked. Rationale: there are locations where only the NAVAID is inspected IAW FAA Order VN 8200.3, *POLICY WITH RESPECT TO MILITARY PROGRAM PROCEDURES FOR FLIGHT INSPECTION OF FOREIGN-OWNED AIR NAVIGATION FACILITIES*, and not the associated instrument procedures.

7.3.2. A flight simulator or tabletop review will be accomplished prior to publication when a flyability check is not required IAW paragraph **7.3.1.1.** and/or paragraph **7.3.1.2.** above. Document the flight simulator or tabletop review using AF IMT 3992, ***Approach Flyability,*** or AF IMT 3993, ***Departure Flyability***, whichever is appropriate. These forms shall be maintained with the instrument procedure package.

NOTE: 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 US FAR Part 121 air carrier operations."

7.3.3. 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/radio reception, 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 can be made when departing, if practical.

7.3.4. Amendments to existing, published procedures do not require flyability checks or tabletop/simulator reviews.

7.3.5. FTIP Flight Inspection Requirements.

7.3.5.1. When publishing a host nation procedure obtained from an AIP or via agreement for existing procedures, a flight inspection is required IAW paragraph **1.3.4.4.** to be accomplished prior to publication in the DoD FLIP.

7.3.5.2. When the MAJCOM has been given the authority to develop and publish a procedure at a host nation location, a flight inspection of the procedure shall be obtained.

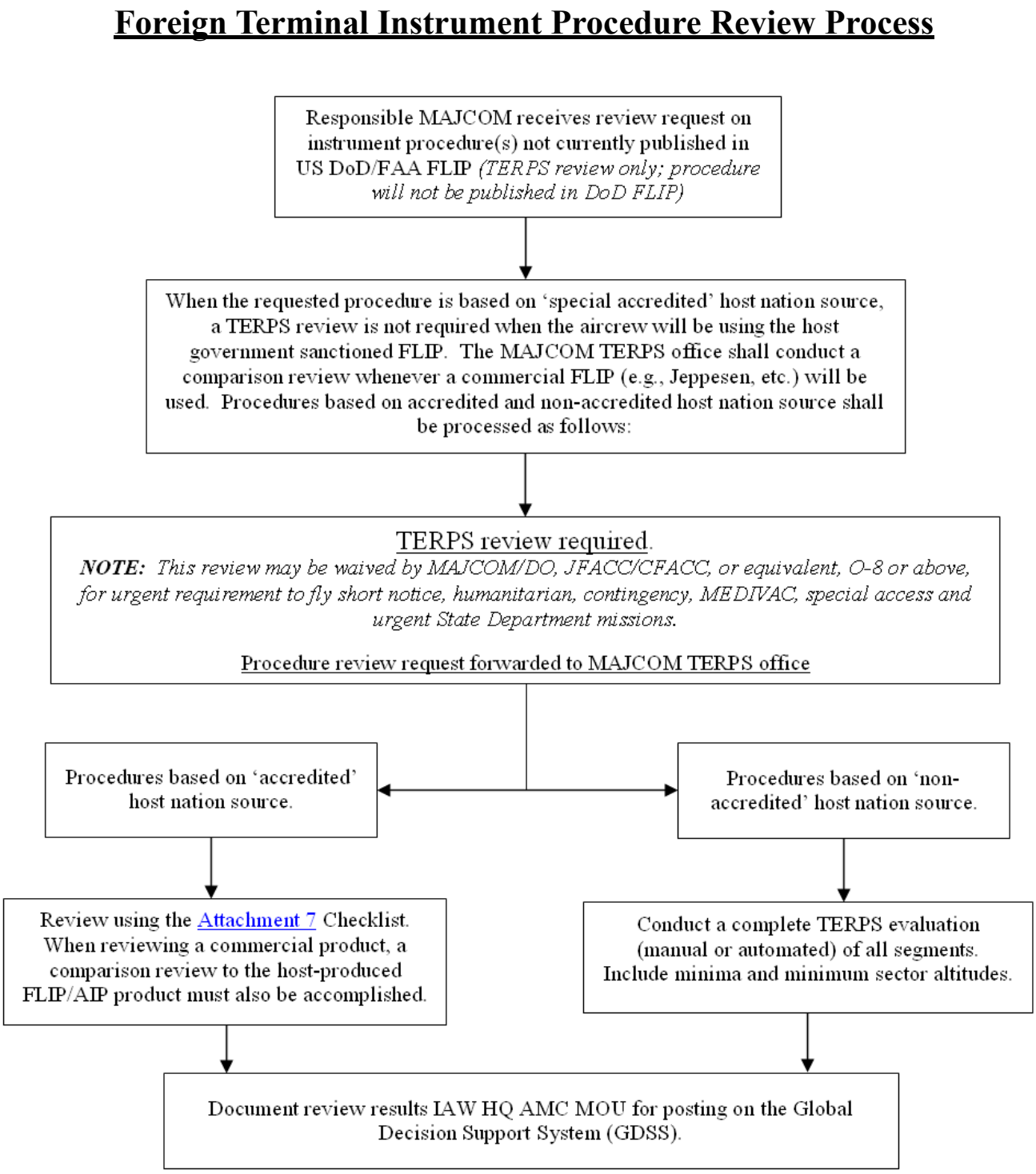
7.3.5.3. Flight inspection may be performed by any of the following;

7.3.5.3.1. The FAA or

7.3.5.3.2. An ICAO certified/approved host government or private flight inspection authority

NOTE: Flight inspections conducted by a host nation flight inspection authority are 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 criteria.

Figure 7.2. Process for Reviewing FTIP



7.4. FTIP Procedure Turns.

7.4.1. 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-degree offset of the 45/180-degree procedure turn when they are not shown on the foreign procedure.

7.4.2. When a "Remain within Distance" is not published by the host nation, determine the intended "Remain within Distance" for the procedure turn and publish it.

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

7.5. Metric Minima. When developing or reviewing FTIP, determine the units of measurement (for example; meters, feet, or statute miles [SM]) used by the host in air-to-ground communications for ceiling, RVR, and prevailing visibility (PV) at each airfield. The same units of measurement used by the host must be published on the DoD FLIP product and provided to aircrews in the TERPS review.

7.5.1. Convert host nation climb and descent gradients expressed as a percentage to a *foot-per-nautical-mile* (ft/NM) value. Example: When converting 6.8% into a gradient expressed in ft/NM, multiply the percentage by 6076.11548 (.068 X 6076.11548 = 413.1758526 ft/NM).

NOTE: 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 foot-per-nautical-mile (ft/NM) value. The differences are small and inconsequential, thus coordination with the host is not necessary. Example: When converting a 3.3% host nation climb gradient, consider it equal to 200 ft/NM even though mathematically it converts to 200.5 ft/NM (200.5 would normally be rounded up to 201 which would be rounded up again for publication purposes to 210).

7.5.1.1. When a host nation publishes QFE heights, they shall be published in parentheses below the associated QNH altitudes.

NOTE 1: A pressure type altimeter calibrated in accordance with the Standard Atmosphere when set to a QNH altimeter setting will indicate altitude above sea level (MSL).

NOTE 2: A pressure type altimeter calibrated in accordance with the Standard Atmosphere when set to a QFE altimeter setting will indicate height above the QFE reference datum.

NOTE 3: 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.

7.5.1.1.1. Metric Altitudes.

7.5.1.1.1.1. Convert meters to feet by dividing the meter value by 0.3048.

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

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

7.5.1.1.1.2.2. Departure procedures (prior to reaching the enroute segment), Feeder, Initial, Intermediate segment – 100-foot increment.

7.5.1.1.1.2.3. FAF, stepdown fix, MDA - 20-foot increment.

7.5.1.1.1.2.4. DH – 1-foot increment.

7.5.1.1.2. QFE Altitudes.

7.5.1.1.2.1. The difference between the QNH and the QFE should equal the field elevation, or the threshold elevation if the threshold is more that 2 meters (7 feet) lower than the field elevation.

7.5.1.1.2.2. Convert and round metric QNH values to US QNH values.

7.5.1.1.3. Do not convert and round metric QFE values. Derive QFE values by subtracting the elevation in **7.5.1.1.2.1.** from the altitudes in **7.5.1.1.2.2.**

7.5.2. FTIP Approach Minima Validation. Refer to AFMAN 11-226(I), Volume 1, Chapter 3, when required to compute or validate FTIP ceiling and visibility minima. Convert feet and SM values to the host unit of measurement (normally meters) and publish the metric minima values. Publish the higher of resultant computations or the host's published values. Adjust minima upward when necessary to publish reportable weather values IAW **Attachment 2**. Specific guidance on some of the paragraphs in AFMAN 11-226(I), Volume 1, Chapter 3 follows.

NOTE: DoD published changes to FTIP minima values due to rounding, adjusting upward to meet publishable values, or application of any requirement in paragraph **7.5.2.**, do not require coordination with the host nation prior to publication.

7.5.2.1. When the touchdown zone elevation (TDZE) is not known use the threshold elevation (THRE) for computing the height above touchdown (HAT).

7.5.2.2. When both the TDZE and the THRE are not known use the airport elevation for computing the HAT.

7.5.2.3. Publish ceiling values based on the height above airport (HAA) value. When the host nation uses the TDZE or THRE instead of the field elevation to calculate the HAA, recalculate and publish the HAA using the field elevation.

7.5.2.4. Publish a note in the profile anytime HAT figures are not according to US TERPS criteria. Example: "NOTE: HAT calculated from threshold".

7.5.2.5. Paragraph 332, Effect of Obstacles. When obstacles penetrate the visual assessment surfaces, visibility values will be affected. Use criteria contained in AFMAN 11-226(I), Volume 1, paragraph 251. Apply the following:

7.5.2.5.1. Procedures based on accredited host nation source do not require evaluation using paragraph 251.

NOTE: MAJCOM TERPS authorities may evaluate procedures based on accredited host nation source IAW paragraph 251 when deemed necessary. When an evaluation is accomplished and a penetration of the 20:1 OIS is found, the obstruction must be identified on the procedure and the host nation informed of this potential hazard (see paragraph **7.5.2.5.3.**).

7.5.2.5.2. Procedures based on non-accredited host nation source shall be evaluated using paragraph 251. When a penetration of the 20:1 OIS is found, the obstruction must be identified on the procedure (see paragraph **7.5.2.5.3.**) and the host nation informed of this potential hazard.

7.5.2.5.3. Publish a note identifying the 20:1 OIS penetration. Example: "Trees 120 AGL/220 MSL .4 NM from threshold, 50 feet right of course. USAF: Straight-In procedure to Rwy XX/Circling to Rwy XX at night requires approval from MAJCOM/DO or equivalent".

7.5.2.6. Paragraph 334a. Do not apply.

7.5.2.7. Paragraph 334b. Do not apply.

7.5.2.8. Paragraph 342. When runway markings and/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 3992/3993.

7.5.2.9. Paragraph 360. Do not apply.

7.6. NOTAMs.

7.6.1. 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 FLIP, correct the DoD procedure by issuing a NOTAM reflecting the changes made by the host. When the host changes are extensive in nature, issue a NOTAM not authorizing use of the DoD procedure until a revised procedure can be published in the DoD FLIP.

7.6.2. Issue NOTAMs on FTIP published in the DoD FLIP. Do not issue NOTAMs on the host nation procedure (source).

7.6.3. Specify the exact DoD published instrument procedure affected (include amendment number as applicable) in the NOTAM.

7.7. DELETED.

Chapter 8

FLYABILITY CHECK AND FLIGHT INSPECTION REQUIREMENTS

8.1. Flyability Check of Instrument Procedures. Except as indicated in this AFI, each new instrument procedure published by the USAF shall have a flyability check (either 'live', 'simulator', or 'table-top') completed prior to submission for flight inspection. A DoD aircrew shall complete a 'live' flyability check on each USAF developed instrument procedure prior to initial publication.

***NOTE*:** 'Simulator' or 'table-top' reviews are not acceptable on instrument procedures developed by the USAF.

8.1.1. Document the flyability check using AF IMT 3992 or AF IMT 3993. The pilot conducting the flyability check should simulate the most restrictive aircraft category and must evaluate the entire procedure. The procedure is acceptable if the pilot conducting this check determines that:

8.1.1.1. The procedure is operationally sound and required aircraft maneuvering is consistent with good operating practices.

8.1.1.2. Cockpit workload is acceptable for a low time pilot with minimal IFR/IMC experience.

8.1.1.3. Charts can be easily interpreted and contain proper information.

8.1.1.4. The procedure ensures safety of flight using the guidance in AFMAN 11-217, *Instrument Flight Procedures,* or as explained in the procedure.

8.1.1.5. See **Attachment 8** for instructions on the use of AF IMT 3992 and AF IMT 3993.

8.1.2. When a flyability check cannot be completed (NAVAID not available/commissioned, 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, flyability check considerations must be documented on the flight inspection report.

NOTE: AF IMT 3992 or AF IMT 3993 is not required in this instance.

8.1.3. Flyability checks shall be performed within 120 days of the original request from the TERPS authority, unless otherwise coordinated. When the flyability check is not completed within the allotted time, notify the unit requesting the procedure that because a flyability check was not completed, the request for the procedure has been cancelled and must be re-submitted for procedure development to be re-initiated.

8.2. Flight Inspection of Instrument Procedures. Flight Inspection IAW FAA Order 8200.1 (AFMAN 11-225) is the final step in the process of certifying an instrument procedure. Instrument procedures developed by the U.S. Air Force that require the use of Instrument Flight Rules or will be used in instrument meteorological conditions (IMC) shall be flight inspected IAW AFMAN 11-225, Section 214, except as indicated in this AFI. Submit requests for flight inspection services IAW instructions in FAA Order 8240.32, *Request for Flight Inspection Services.*

8.2.1. Each instrument procedure package submitted for flight inspection shall contain the following:

8.2.1.1. A cover letter stating, as a minimum, all appropriate points of contact and an address to where the completed package is to be returned. Additionally, if the procedure is a revision, define (in bullet statements) what has changed on the procedure and what requires flight inspection consideration.

8.2.1.2. The paper copy approach or departure procedure report from GPD, and an electronic copy of the procedure build from GPD, as appropriate.

8.2.1.3. Maps. 1:100,000 scale planimetric/topographical charts or the next best available scale, are recommended.

8.2.1.3.1. A planimetric map is defined as one that displays only the horizontal positions of features represented. It is distinguished from a topographic map by the omission of terrain relief. The features usually shown on a planimetric map include rivers, lakes, and coast lines; vegetated areas (forests); cities, transportation routes, and public utility facilities; and political and private boundary lines. Planimetric maps created using GPD and the appropriate vector product layers (VMAP, UVMAP) with the procedure plotted to correct scale meet this requirement. Ensure quarter degree grid lines are depicted. Depict only those layers that are useful to pilot orientation, avoiding excessive chart clutter.

8.2.1.3.2. Topographical charts created using GPD and the appropriate raster (CADRG) or GeoTiff (VFR sectional) product with the procedure plotted to correct scale meet this requirement.

8.2.1.3.3. Paper maps/charts are authorized for manually developed procedures. Do not send maps with overlays/transparencies taped to the map. Procedure segments should be drawn or traced directly on the chart.

8.2.1.3.4. Do not send a single map for multiple procedures.

8.2.1.3.5. Controlling obstacles must be identified and highlighted; these obstacles shall be identified so that they correlate to the controlling obstacles listed on approach or departure procedure build output of GPD and the map template. See **Figure 8.1.** for an example of the map template to be placed on the map.

Figure 8.1. Controlling Obstacle Map Template Example (approach procedure)

Airport ID:	**KVAD**	GPD Output Reference #	SEGMENT	OBSTRUCTION	MSL ELEV
Airport Name:	**Moody AFB**				
City:	**Valdosta**	**424**	**Initial**	**Tower**	**497**
State:	**Georgia**	**4666**	**Intermediate**	**Tower**	**498**
		353	**Final (ILS)**	**Trees**	**239**
Procedure ID:	**HI-ILS Rwy 36R**	**485**	**Final (LOC)**	**Antenna**	**340**
Amdt. #:		**417**	**Missed Apch**	**Trees**	**247**
Date Drawn:	**3/20/04**	**38**	**Circling A-E**	**Water Tower**	**411**
Scale:	**1:100,000**				

8.2.1.4. 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 the graphic produced by GPD. Procedure revision packages may include a copy of the existing NGA graphic with the changes added (penned in), or a new GPD FLIP graphic depiction with the changes highlighted. RNAV (GPS) procedures shall have both the magnetic courses and true courses depicted in the plan and profile view. The true course shall be adjacent to the magnetic course in parenthesis, e.g.: (240T).

NOTE: The profile view must be added manually to the GPD build until GPD is capable of producing this view.

8.2.1.5. Each applicable FAA Form 8260-2, *Radio Fix and Holding Data Record.*

NOTE: 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."

8.2.1.6. FAA Form 6050-4, *Expanded Service Volume Request*, when applicable.

8.2.1.7. AF IMT 3980, *Waiver*, when applicable.

NOTE: When the procedure is new and HQ AFFSA has not approved a waiver, submit this IMT with Blocks 1-8 completed.

8.2.1.8. Any additional information that has relevance to the procedure that may aid in the flight inspection process.

8.2.2. Submit 2 copies of the procedure package to the flight inspection office not later than 10 duty days (14 duty days outside CONUS) prior to the scheduled/anticipated flight inspection date. One copy will remain with the flight inspection office and the other will be provided to the flight crew.

8.2.3. Contingency and/or short-notice flight inspections shall be coordinated as soon as possible between the MAJCOM or CFACC/JFACC (or equivalent) and the flight inspection office. Flight inspection of short-notice requirements in overseas theaters may be delayed or prohibited by timelines required to process country clearance and diplomatic visa requests. Earliest possible notification of potential flight inspection requirements will improve the flight inspection office's ability to respond. Flight inspection requests inside foreign clearance guide timelines will require MAJCOM/theater assistance to expedite clearance requests.

8.3. Flight Inspection of Special Use Instrument Procedures.

8.3.1. Special use procedures do not require flight inspection when all of the following conditions can be met to achieve an equivalent level of safety:

8.3.1.1. The special use procedure uses NAVAIDs that have been flight inspected according to AFMAN 11-225 or ICAO Annex 10.

NOTE: Not applicable to Airborne Radar Approach (ARA) procedures.

8.3.1.2. All segments (including holding) of the special use procedure are within the standard service volume and usable coverage of the NAVAIDs used.

NOTE: Not applicable to Airborne Radar Approach (ARA) and PAR procedures.

8.3.1.3. The special use procedure has received a flyability check that verifies the controlling obstacle in each segment of the procedure.

NOTE: The aircrew performing the flyability check must be briefed to accomplish this prior to the flyability check and the flyability check IMT must be annotated that this was completed satisfactorily.

8.3.1.4. The note "RADAR REQUIRED" is clearly indicated on the procedure.

NOTE: Aircraft using the special use procedure must be monitored by ATC radar throughout the entire procedure, to include missed approach and any holding.

8.3.2. When all the requirements of paragraph **8.3.1.** cannot be fulfilled, the procedure requires flight inspection prior to being used/published.

8.3.3. MAJCOM commanders or the JFACC/CFACC (or equivalent) may waive any of the conditions in paragraphs **8.3.1.1.** through **8.3.1.4.** without prior approval from HQ AFFSA when IMC use of the special use instrument procedure is essential due to a military emergency or an urgent military necessity. MAJCOMs or the JFACC/CFACC (or equivalent) will notify HQ AFFSA/XO/XOI of their intention to exercise this waiver option.

NOTE: Reference short-notice/contingency TERPS; when all requirements of paragraph **5.1.7.** are being applied and after notification in paragraph **8.3.3.** is made to AFFSA/XO/XOI, ***nonstandard*** instrument procedures may be used prior to AFFSA/CC review and approval. The TERPS OPR shall forward all required waiver documentation to AFFSA/XOI as soon as possible for AFFSA review and approval.

8.3.4. Flight inspection of special use procedures based on host nation source (FTIP) 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 criteria.

8.4. AF IMT 3992, *Instrument Procedure Flyability Check, Instrument Approach Procedure (IAP).* The instructions for this IMT are located in **Attachment 8**.

8.5. AF IMT 3993, *Instrument Procedure Flyability Check, Departure Procedure (DP).* The instructions for this IMT are located in **Attachment 8**.

Chapter 9

MINIMUM VECTORING ALTITUDE AND MINIMUM IFR ALTITUDE CHARTS

9.1. Minim Vectoring Altitude (MVA) Chart. The MVAC is used to determine the lowest useable IFR altitude at which an aircraft may be vectored and maintain clearance from obstructions/terrain and uncontrolled airspace in a radar environment. Develop and maintain MVACs as directed by ATC facility management, using the Chart Designer module of USAF Global Procedure Designer (GPD) software (see AFI 13-203 for MVAC applicability). After creating a new chart, but prior to sector design, review workspace and obstacle quality reports to identify and resolve issues relating to poor data quality. Compare ingested digital aeronautical data against source data (i.e. aerodrome/ASR location, ASR magnetic variation) and resolve discrepancies prior to chart development. Resolve all criteria violations identified by GPD or provide justification prior to export. Coordinate with ATC facility management and senior operational commander and document on AF IMT 4332, 20040301, V1 **ATC Chart Signature Page.** FAA/Host Nation signatures are only required when mandated by formal agreement. Forward MVAC packages to MAJCOM TERPS function for review and obtain approval prior to use. MVACs do not require flyability/flight inspection.

NOTE 1: Resolve data discrepancies prior to chart construction. Changes to ASR or chart center location made after chart construction will result in a condition where the chart cannot be restored.

NOTE 2: USAF locations with TERPS responsibility and where terminal radar service is provided by the FAA/host nation (i.e. USAF VFR tower) are not required to develop a MVAC, however they are required to obtain a copy of the FAA/host nation MVAC from the controlling facility for reference during instrument chart development. Locations that are required to develop MVACs are also required to obtain copies of the MVAC developed by adjacent ATC facilities and required to prevent excessive altitude changes between the two facility's adjoining MVA sectors.

9.1.1. Definitions and chart types.

9.1.1.1. Terminal MVAC. This chart supports those systems where radar data is provided by a feed from a single short range (terminal) ASR/DASR antenna. Develop terminal MVACs for legacy analog radars (GPN-12/GPN-20) and mobile ASRs (MPN-14/TPN-19), and DASR (GPN-30). They are also developed to support the designated terminal area of a multi-sensor 'mosaic' system when the area is adapted to exclusively utilize a single terminal radar. A terminal MVAC does not support a terminal 'mosaic' area where radar data is provided by more than one radar (ASR/DASR or ARSR) or a terminal area where controllers have the ability to switch from terminal to 'mosaic' mode. 3 NM lateral separation is provided from terrain and obstructions (sector buffer) within 40 NM of the ASR/DASR and 5 NM lateral separation is provided 40 NM or greater from the chart center. A terminal MVAC must be centered on the terminal ASR/DASR radar antenna in order for GPD to determine where to increase from 3 to 5 NM lateral separation.

9.1.1.2. Enroute MVAC. This chart supports those systems where radar data is provided by a feed from one or more long range (enroute) ARSR antennas, or a feed from more than one terminal radar. Develop enroute MVACs for multi-sensor 'mosaic' systems (MEARTS, STARs), except for the areas specified in paragraph **9.1.1.1.**. When a terminal MVAC is developed for the terminal area of a multi-sensor system, develop and maintain both terminal and enroute MVACs. Enroute MVACs are also required to provide backup for Center Radar Presentation (CENRAP) operations. 5 NM lateral separation is provided from terrain and obstructions (sector buffer) regardless of the distance from the chart center/aerodrome. Chart center is not required to be at any set location, but is normally the center of assigned ATC airspace or the ARP of the primary airport. Enter into GPD Data Manager a 'pseudo' ASR radar (named 'chrt_ctr') at the desired location. Use the aerodrome magnetic variation as the ASR magnetic variation of 'chrt_ctr' when this option is used.

9.1.1.2.1. When CENRAP is utilized as a backup to a terminal system; separate terminal and enroute charts must also be developed.

9.1.1.2.2. Facility managers may elect to develop a single enroute chart to support both normal and CENRAP operations to reduce complexity.

9.1.1.3. Standard sector. A sector bounded by two bearings and two ranges (arcs) relative to chart center.

9.1.1.4. Irregular sector. A more complex sector bounded by more than two bearings and two ranges relative to chart center.

9.1.1.5. Prominent obstacle sector. An "all buffer" sector intended to provide 3 or 5 NM lateral separation from a single obstacle.

9.1.1.5.1. This sector type is only authorized to provide separation from an isolated, man-made obstacle that is significantly higher than surrounding terrain/obstructions (see **Figure 9.1.**).

9.1.1.5.2. Prominent obstacle sectors cannot be used to provide separation from terrain features such as mountain peaks, since both obstacles and terrain are excluded from the determination of the minimum altitude of the sector(s) surrounding or adjoining the prominent obstacle sector (see **Figure 9.2.**).

9.1.1.5.3. This sector type is not authorized when the highest terrain in the prominent obstacle sector is greater than the MVA minus applicable ROC of the surrounding/adjoining non-prominent obstacle sector(s).

9.1.1.5.4. This sector type is not authorized when the minimum altitude based on the highest obstacle/terrain in the sector is greater than the MSL height of the selected obstacle + vertical accuracy (Obstacle Effective Height) + applicable ROC.

NOTE: GPD will not prevent misapplication of the above (paragraphs **9.1.1.5.1.** through **9.1.1.5.4.**).

9.1.1.6. Polygonal sector. A sector defined by the WGS-84 coordinates of each corner (vertex). There is no limit to the number of sides to this type sector.

Figure 9.1. Correct Application of Prominent Obstacle Sector.

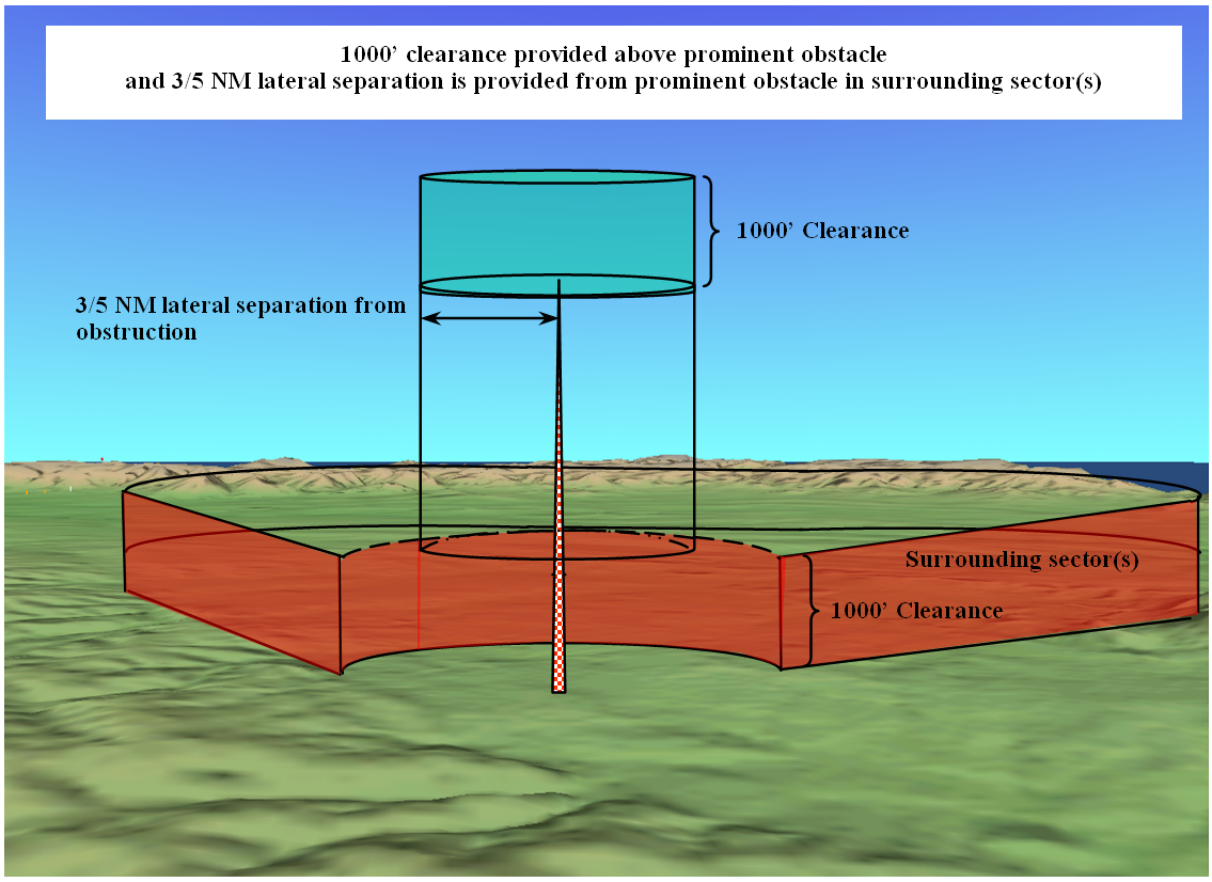
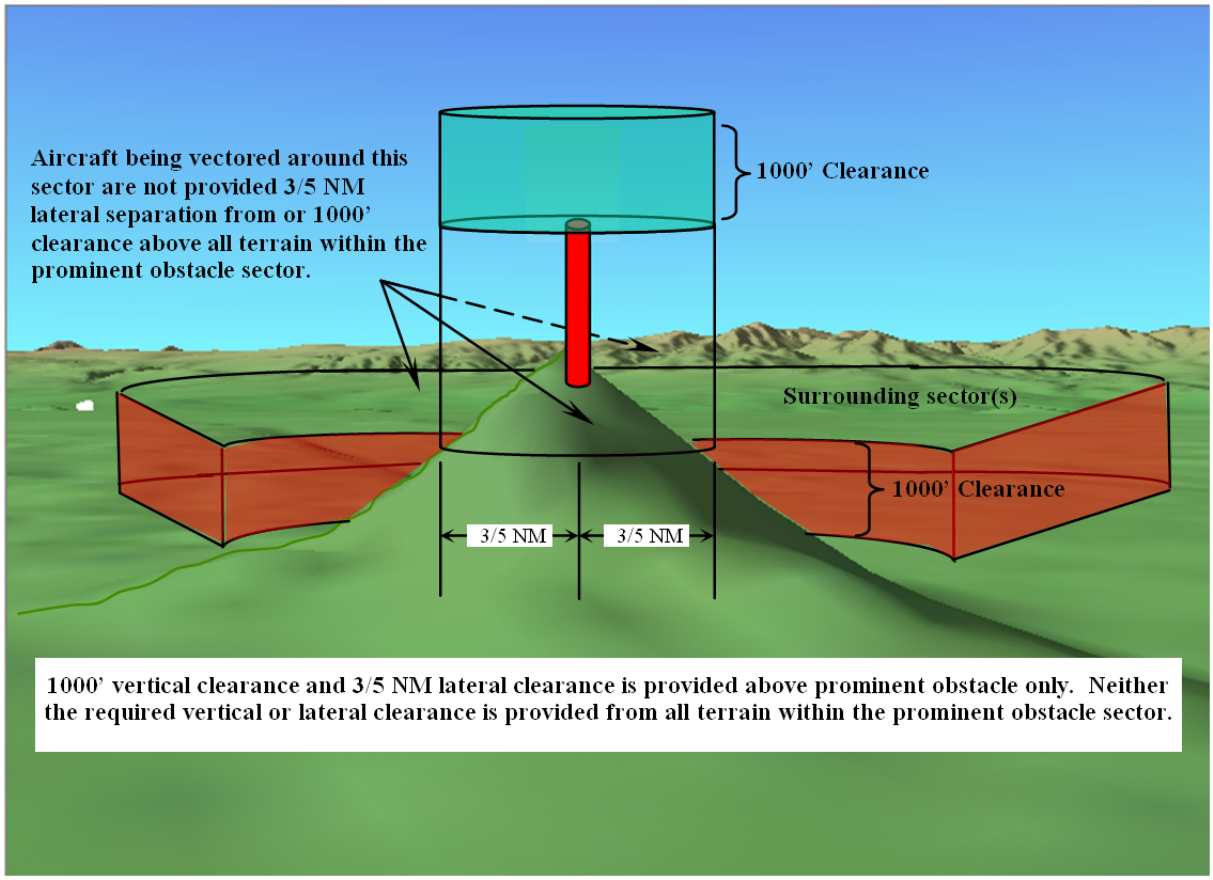


Figure 9.2. Incorrect Application of Prominent Obstacle Sector.



9.1.2. Chart design.

9.1.2.1. Determine which type chart (Terminal/Enroute/both) is applicable based on paragraph **9.1.1.**.

NOTE: Establish MVACs without respect to normal primary radar coverage in the area considered for obstacle clearance. It is ATC's responsibility to determine whether or not target strength is adequate for radar control. It is not relevant to MVAC development whether radar service in a specific area is provided using primary or secondary radar.

9.1.2.1.1. For a Terminal MVAC, the area considered for obstacle clearance (chart radius) shall extend to the maximum range of the ASR radar and be large enough to include all delegated airspace to include adjacent areas where control responsibility is assumed because of early handoff or track initiation. EXCEPTION: When developing a Terminal MVAC to support the designated terminal area of a multi-sensor system (see paragraph **9.1.1.1.**), the area must only be large enough to include the entire terminal area to include the appropriate buffer area based on the distance from the ASR/DASR.

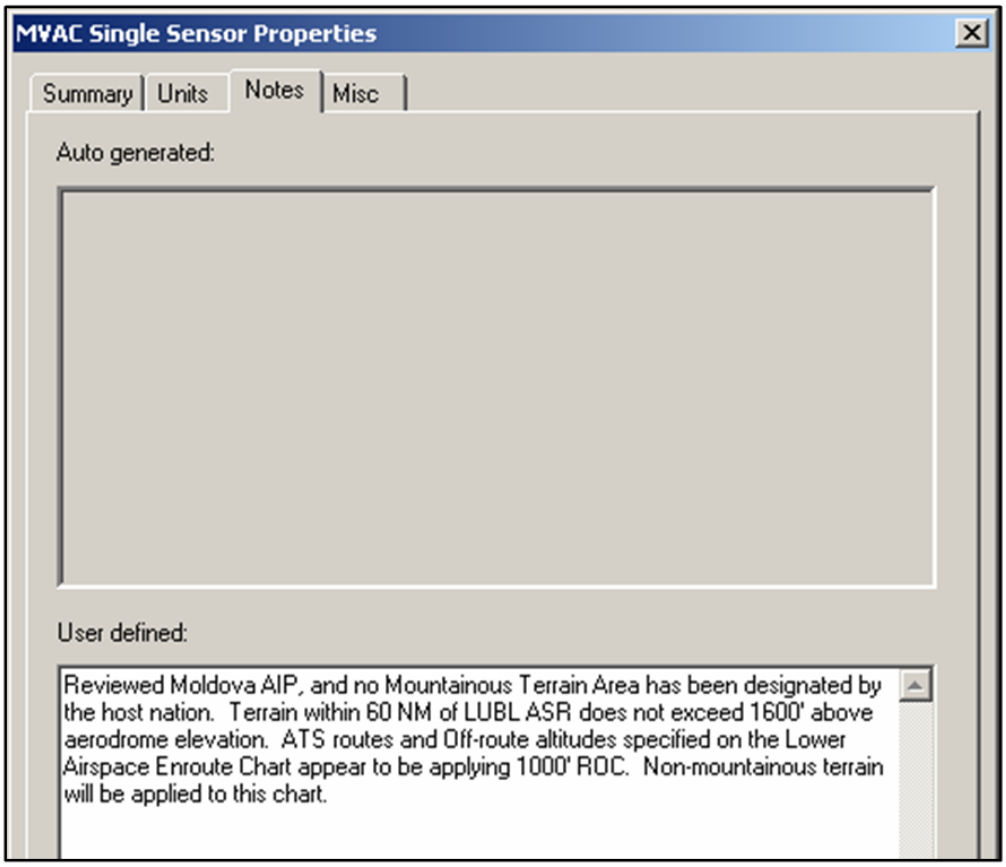
9.1.2.1.2. For an Enroute MVAC, the area considered for obstacle clearance (chart radius) shall be large enough to include 20 NM beyond delegated airspace boundaries to include adjacent areas where control responsibility is assumed because of early handoff or track initiation.

NOTE: When developing an Enroute MVAC, ensure that "Radar has CENRAP display" is selected in the chart properties of GPD regardless of whether or not the chart is being developed for CENRAP operations to ensure the proper buffer size is constructed.

9.1.2.2. To aid in determining the appropriate chart radius, delegated ATC airspace may be entered into GPD Data Manager as a new, unclassified airspace. Provide the airspace a meaningful name (i.e. XXXX approach airspace) and display this airspace during chart development (see GPD Operators Manual, Vol. 1, paragraph 13.11.2). Ensure the coordinates for the airspace are entered in the WGS-84 datum. Delegated airspace parameters are usually detailed in the RAPCON/ARTCC agreements. Provide this delegated airspace data to the MAJCOM TERPS function to aid in review and approval of the chart.

9.1.2.3. Define the chart properties. Specify whether the default terrain type for the chart is designated mountainous or non-mountainous IAW Subpart B of 14 CFR Part 95 in the CONUS. OCONUS, review the appropriate host nation AIP and/or other applicable directives and comply with mountainous terrain designations. When the host nation has not explicitly defined terrain type designations, evaluate the topography of the area to determine if it is equivalent to designated mountainous areas in CONUS. Additionally, check enroute charts (host and NGA) to ascertain the ROC applied on ATS routes and to off-route altitudes (i.e. MORA/OROCA). Make a determination which terrain type is appropriate and document the rationale in the chart's user defined notes (see **Figure 9.3.**).

Figure 9.3. User Defined Note Annotating Mountainous Terrain Designation.



9.1.2.3.1. When non-mountainous terrain is specified, GPD will default to 1000' ROC for all new sectors. When mountainous terrain is specified, 2000' ROC will be applied as the system default.

9.1.2.3.2. Where lower altitudes are required in designated mountainous areas to achieve compatibility with terminal routes or to permit vectoring to an instrument approach, the default ROC may be reduced to

1000’ for a Terminal MVAC, and 1500’/1700’ for an Enroute MVAC as specified in FAA Order 8260.19, paragraph 363, and FAA Order 8260.3, paragraphs 1720b(1) and (2).

9.1.2.4. Specify the appropriate allowance for trees based on documented maximum tree height for the area.

NOTE: This allowance will be applied uniformly to the entire terrain model. In areas without widespread vegetation, areas where the maximum tree height varies significantly from one part of the chart to another, or when Shuttle Radar Topography Mission (SRTM) data is used, it may be more appropriate to specify sector altitudes that ensure clearance above terrain + known tree height and document the application of this process in the user defined notes.

9.1.3. Sector Design.

9.1.3.1. Make each obstacle sector (except for prominent obstacle sectors) large enough to permit the efficient and safe vectoring of aircraft. Consideration should be given to aircraft performance and phase of flight.

9.1.3.2. Specify standard, irregular, or polygonal sectors or any combination thereof based on the terrain/obstacle and airspace environment or other operational requirements (radar patterns, noise abatement areas, SUA, etc.). Ensure sector coverage over the entire chart with no gaps between sectors. With the exception of a prominent obstacle sector, each sector's boundary should adjoin (but not overlap) the boundary of each adjacent sector. In some cases it may be desirable to combine adjacent smaller areas having different altitudes into a single large area with one altitude. See **Figure 9.7.** and **Figure 9.8.**.

NOTE: There is no limitation to what sector types may be developed for either a terminal or enroute MVAC. For example, polygonal sectors can be established for a terminal chart, and standard sectors can be defined for enroute. However, when MVAC sector design impacts MSAW, consider low altitude alerting development limitations (for example, MEARTS MSAW sectors can only be defined as convex polygons; PIDP MSAW sectors can only be defined as range/bearing). Coordinate with ATC automation personnel when applicable to determine optimum sector design. MVAC sector design has no bearing on STARS MSAW.

9.1.3.3. When a single, isolated, man-made obstacle causes the entire sector altitude to be higher than desired, a prominent obstacle sector may be established (see paragraph **9.1.1.5.**). A prominent obstacle sector may overlap another sector or adjacent sectors.

9.1.3.4. Specify sector altitudes no less than the minimum altitude. The selected altitude shall provide at least the required ROC above obstructions and terrain + vegetation allowance in the sector (including buffer) and must be at least 300 feet above the highest floor of controlled airspace in the sector (not including buffer), rounded to the higher 100’ increment. Annotate each sector where paragraph **9.1.2.3.2.** is applied with the statement "ROC reduced to less than 2000’”.

NOTE 1: Floor of controlled airspace in mountainous areas or sparsely populated areas, may be as high as 14,500 feet MSL. When the minimum altitude is higher than desired due to a high floor of uncontrolled (Class G) airspace, and when operationally required by ATC (i.e. routinely expected to vector aircraft in Class G), two sector altitudes may be established. One sector altitude shall be based on the floor of controlled airspace and the second based on obstruction clearance.

NOTE 2: The terrain used for floor of controlled airspace determination does not include the vegetation allowance.

9.1.3.4.1. In CONUS, display the applicable NACO Digital VFR sectional in order to determine the highest floor of controlled airspace. Digital VFR sectionals are in a geo-referenced tagged image format. In order for them to display correctly, GPD display parameters must be changed to match the spatial reference attributes.

9.1.3.4.1.1. Open the HTML document associated with the VFR sectional of interest and find the spatial reference information (see **Figure 9.4.**). Note that all geodetic coordinates must be converted from decimal degrees to DDMMSS.SS (decimal seconds) format.

9.1.3.4.1.2. In GPD chart designer, select "View" from the dropdown menu, and click on "Display Parameters" (see **Figure 9.5.**).

9.1.3.4.1.2.1. In the "Datum" field, enter the Horizontal_Datum_Name from the Geodetic model section of the HTML file.

9.1.3.4.1.2.2. In the "Projection" field, enter the Map_Projection_Name from the Map_Projection section of the HTML file. DO NOT select the "Geodetic" check box.

9.1.3.4.1.2.3. In the "Central Meridian" field enter the Longitude_of_Central_Meridian from the Map_Projection section of the HTML file.

9.1.3.4.1.2.4. In the "Origin Latitude" field, enter the Latitude_of_Projection_Origin from the Map_Projection section of the HTML file.

9.1.3.4.1.2.5. In the "1st Std Parallel" field, enter the first (top) Standard_Parallel from the Map_Projection section of the HTML file.

9.1.3.4.1.2.6. In the "2nd Std. Parallel" field, enter the second (bottom) Standard_Parallel from the Map_Projection section of the HTML file.

9.1.3.4.1.2.7. Also enter False Easting and False Northing when applicable (usually 0). No other fields require changes.

9.1.3.4.1.2.8. After the display parameters are set by clicking "OK", again select "View" from the dropdown. Click on "GeoTIFF" and open the appropriate file VFR sectional file (see **Figure 9.6.**). Note that it may be necessary to repeat the steps in paragraph **9.1.3.4.1.2.** when the MVAC overlies more than one VFR sectional map.

NOTE: This geo-reference process for VFR Sectionals will be automatic in a future release of GPD.

Figure 9.4. Digital VFR Sectional Spatial Reference Information.

Spatial_Reference_Information:
- *Horizontal_Coordinate_System_Definition:*
  - *Planar:*
    - *Map_Projection:*
      - *Map_Projection_Name:* Lambert Conformal Conic
      - *Lambert_Conformal_Conic:*
        - *Standard_Parallel:* 46.666670
        - *Standard_Parallel:* 41.333330
        - *Longitude_of_Central_Meridian:* -112.816670
        - *Latitude_of_Projection_Origin:* 42.300000
        - *False_Easting:* 0.000000
        - *False_Northing:* 0.000000
    - *Planar_Coordinate_Information:*
      - *Planar_Coordinate_Encoding_Method:* row and column
      - *Coordinate_Representation:*
        - *Abscissa_Resolution:* 63.870931
        - *Ordinate_Resolution:* 63.870931
      - *Planar_Distance_Units:* meters
  - *Geodetic_Model:*
    - *Horizontal_Datum_Name:* North American Datum of 1983
    - *Ellipsoid_Name:* Geodetic Reference System 80
    - *Semi-major_Axis:* 6378137.000000
    - *Denominator_of_Flattening_Ratio:* 298.257222

9.1.3.4.2. When digital products are not available to assist in determining the floor of controlled airspace, use the following alternative method. After all sectors are designed but before finalizing sector altitudes, *plot* (not *print*) the chart to the appropriate map scale on clear film (1:500,000 for VFR sectional). Ensure the map grid is on and the map projection/geodetic datum are correctly set. Overlay the clear film on the appropriate hard-copy VFR sectional or host nation equivalent map/chart in order to determine the highest floor of controlled airspace in each sector (not including the sector buffer). Enter the correct floor of controlled airspace for each sector in GPD Chart Designer. Note that some sectors may need to be redesigned in order to achieve the desired vectoring altitude.

9.1.3.4.3. DAFIF-derived airspaces (Class A thru E and SUA) may also be displayed in addition to VFR sectionals, however the controlled airspaces from DAFIF are not comprehensive and should not be used as the sole source for determining the floor of controlled airspace in CONUS.

9.1.3.4.4. Host nations may detail floor of controlled airspace in their AIPs or other sources, however some compute this data differently than US criteria. Check with appropriate host nation personnel to ensure accurate information is applied. When a host nation does not designate the floor of controlled airspace, controlled airspace shall be considered to begin at the surface. Document in the chart's user defined notes and, when available, include a hard copy version of the host nation's airspace description in the Chart package.

Figure 9.5. GPD Display Parameters Dialogue.

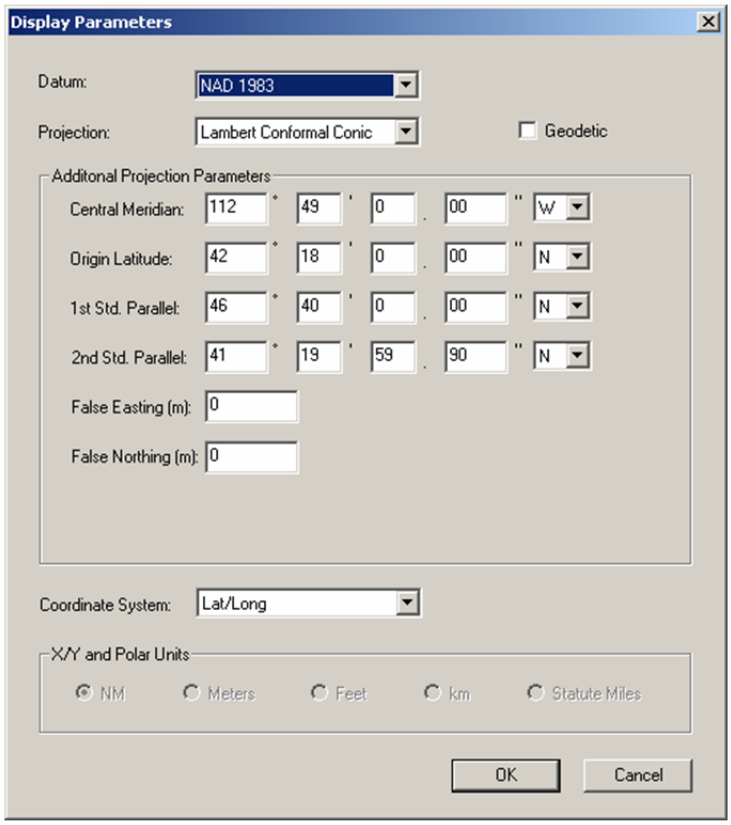


Figure 9.6. MVAC Sectors in GPD Chart Designer with VFR Sectional and ATC Delegated Airspace.

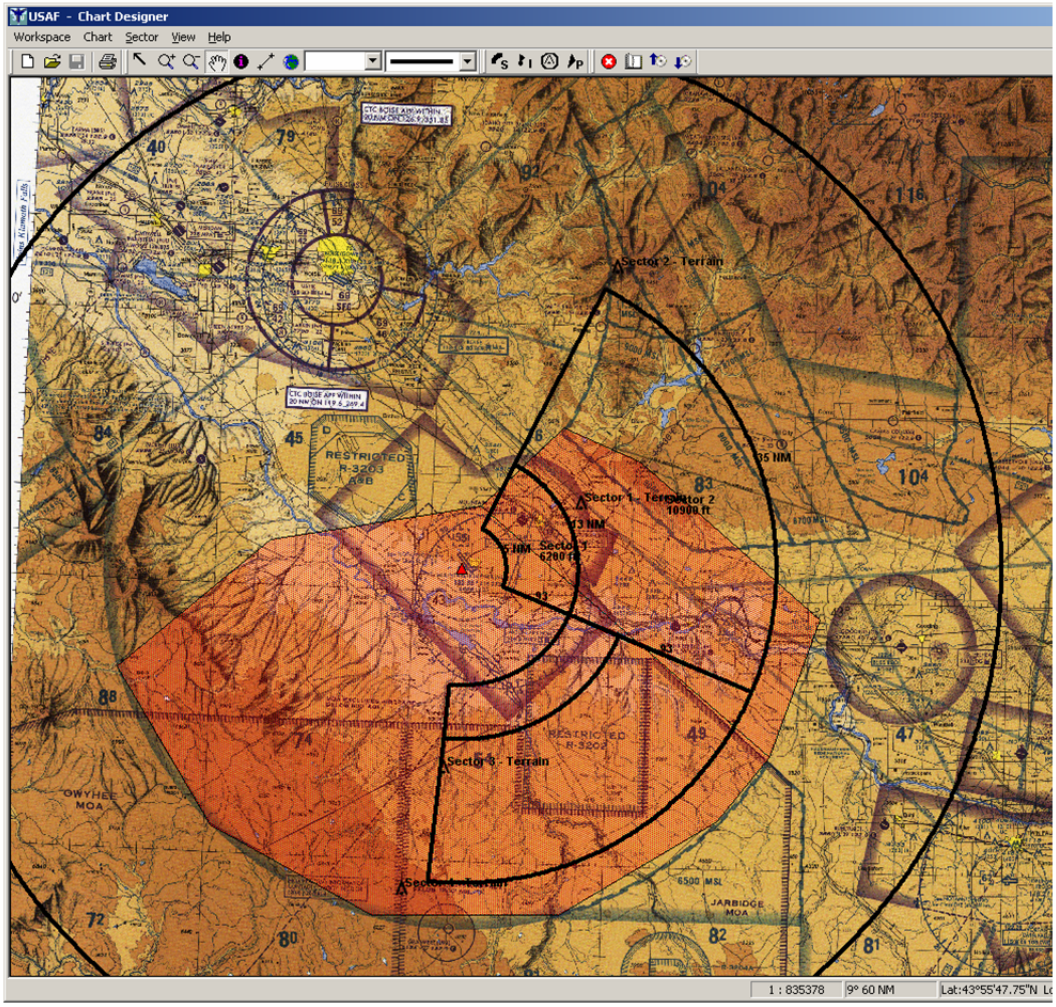


Figure 9.7. Minimum Vectoring Altitude Chart Standard/Irregular/Polygonal/Prominent Obstacle Sectors.

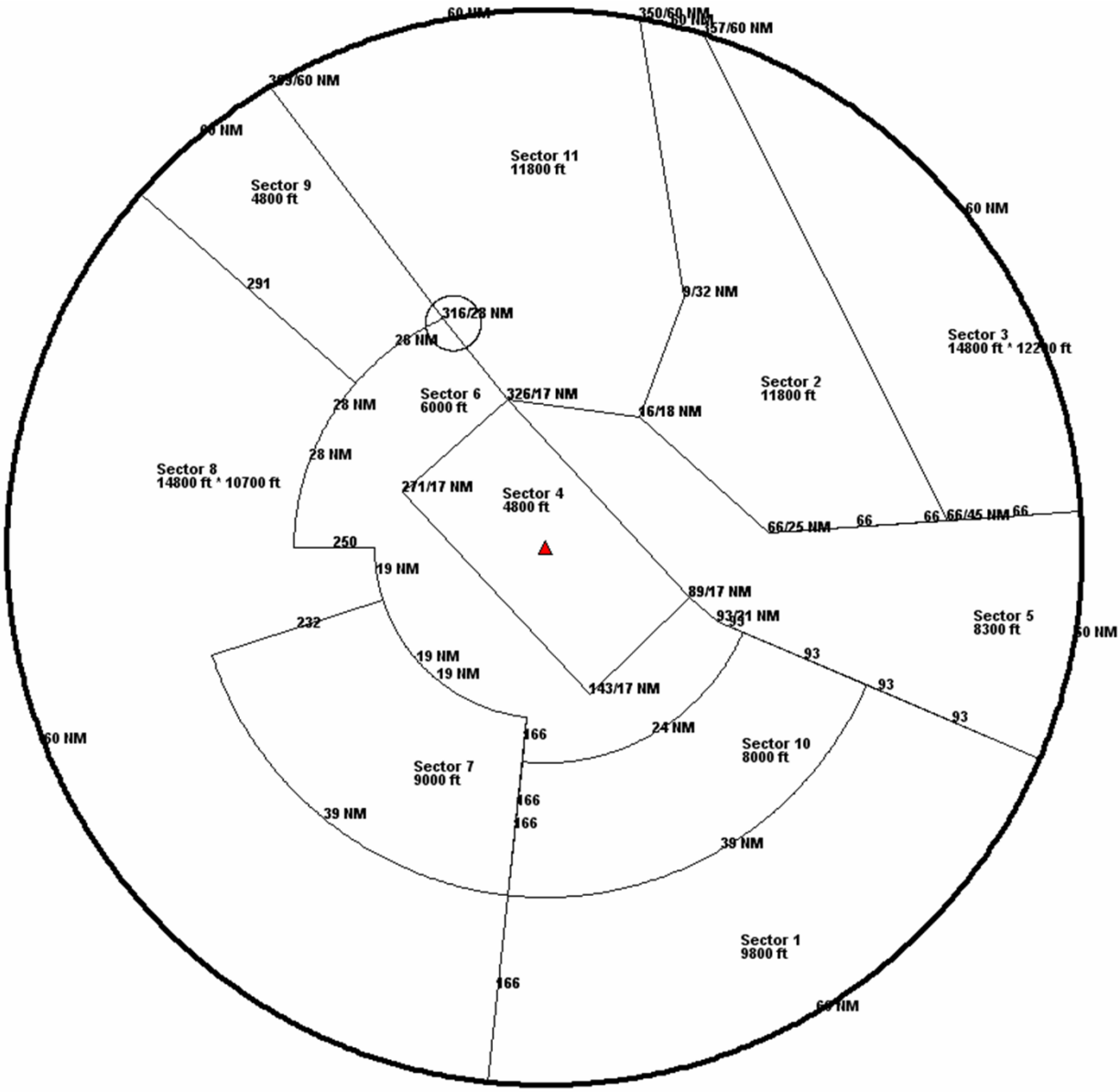
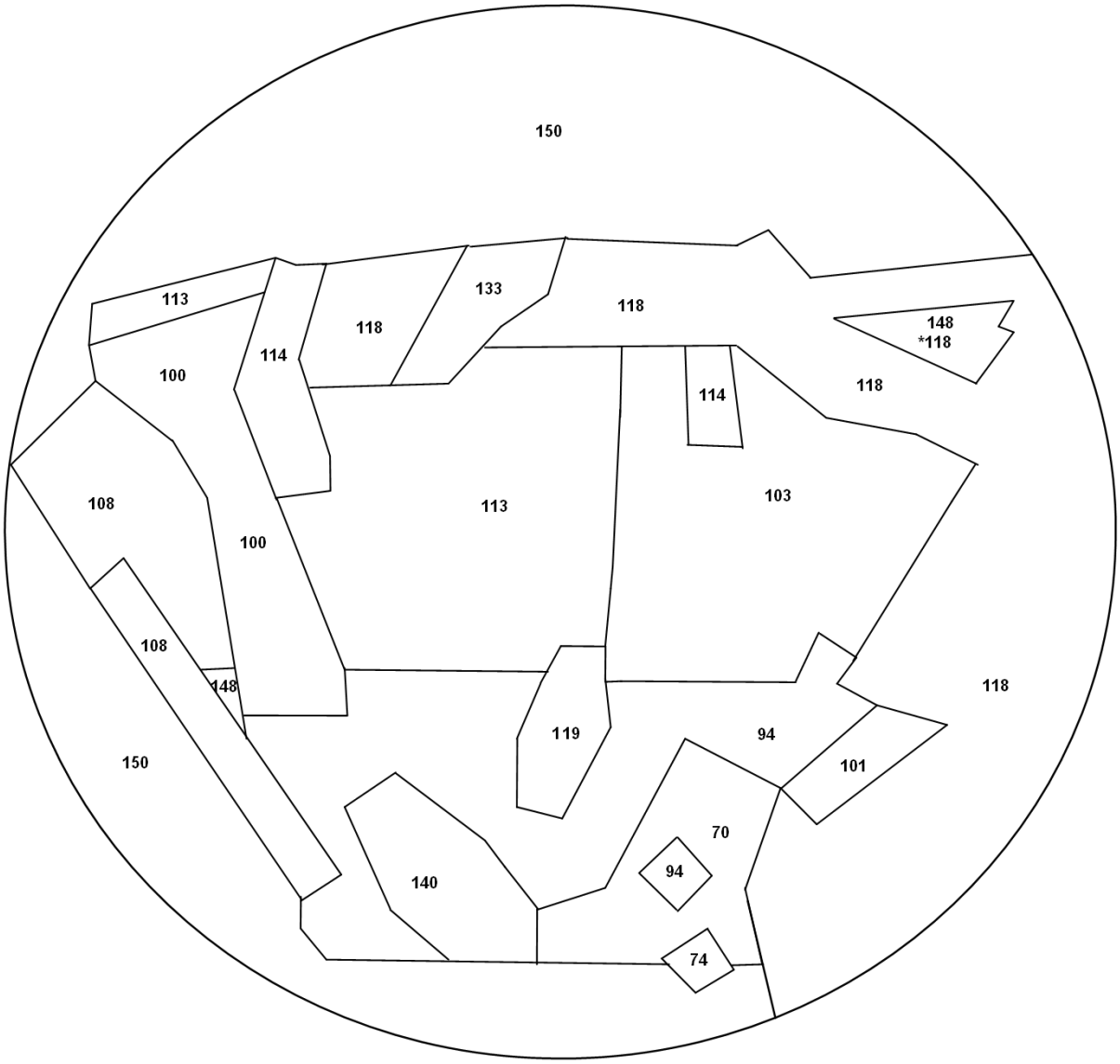


Figure 9.8. Minimum Vectoring Altitude Chart with Polygonal Sectors.



9.2. Minimum Instrument Flight Rules Altitude Chart (MIFRAC). The MIFRAC is used to determine the lowest useable IFR altitude at which an aircraft may operate, receive the appropriate NAVAID, and maintain clearance from obstructions/terrain and uncontrolled airspace in a non-radar environment. Develop and maintain MIFRACs as directed by ATC facility management, using the Chart Designer module of GPD software (see AFI 13-203 for MIFRAC applicability). After creating a new chart, but prior to sector design, review workspace and obstacle quality reports to identify and resolve issues relating to poor

data quality. Compare ingested aeronautical data against source data (i.e. aerodrome/facility location, facility magnetic variation, etc.) and resolve discrepancies prior to chart development. Resolve all criteria violations identified by GPD or provide justification prior to export. Coordinate with ATC facility management and senior operational commander and document on AF IMT 4332, 20040301, V1 **ATC Chart Signature Page.** FAA/Host Nation signatures are only required when mandated by formal agreement. Forward MIFRAC packages to MAJCOM TERPS function for review and obtain approval prior to use. MIFRACs do not require a flyability check or a flight inspection.

NOTE 1: Resolve data discrepancies prior to chart construction. Changes to facility location made after chart construction will result in a condition where the chart cannot be restored.

NOTE 2: Minimum IFR altitudes are separate and distinct from established minimum enroute altitudes on published IFR airways/routes and are only intended for off-route and direct-route operations. The MEA/MOCA in a particular area has no impact on MIFRAC design.

9.2.1. Chart Design. Develop a MIFRAC centered on each omni-directional NAVAID (TACAN, VORTAC, VOR or NDB) in the workspace used for non-radar operations where the distance from the facility to the supported aerodrome is less than or equal to the operational service volume of the NAVAID (see FAA Order 8260.19, para. 208b). The area considered for obstacle clearance (chart radius) must be large enough to encompass the standard NAVAID service volume for the highest altitude where control responsibility is routinely assumed.

NOTE: The existence of an expanded service volume has no bearing on MIFRAC design unless approved for an entire area/sector in which off-route operations are conducted. Normally, ESVs are approved only for a specific fix associated with an instrument procedure.

9.2.1.1. Specify the default terrain type IAW paragraph **9.1.2.3.** and the vegetation allowance IAW paragraph **9.1.2.4.**.

9.2.1.2. MIFRACs must be associated with a MVAC in the chart properties unless operationally necessary (i.e. only non-radar operations are conducted). Develop the MVAC IAW paragraph **9.1.** and save. When defining the MIFRAC properties, associate the new MIFRAC with the saved MVAC.

9.2.2. Sector Design. Chart sectors should be as simple as possible and large enough to permit efficient traffic flow in a non-radar environment. Consideration should be given to aircraft performance and phase of flight.

9.2.2.1. Specify standard or irregular sectors or any combination thereof based on the terrain, obstacle, and airspace environment; MVAC; and/or other operational requirements (radar patterns, noise abatement areas, SUA). Ensure sector coverage over the entire chart with no gaps between sectors. Each sector's boundary should adjoin (but not overlap) the boundary of each adjacent sector. In some cases it may be desirable to combine adjacent smaller areas having different altitudes into a single large area with one altitude (see **Figure 9.10.**).

NOTE: There is no "Terminal" or "Enroute" distinction for MIFRACs; 5 NM lateral separation (buffer area) is provided from terrain and obstructions regardless of the distance to the facility.

9.2.2.2. Specify sector altitudes no less than the minimum altitude. This minimum altitude shall provide at least the required ROC above obstructions and terrain + vegetation allowance in the sector (including buffer) and must be at least 300 feet above the highest floor of controlled airspace in the sector (not including buffer), rounded to the higher 100' increment. Selected sector altitude shall not be lower than the MVA for that given area. **CAUTION:** Two or more MVA altitudes may affect a single MIFRAC sec-

tor. Annotate each sector where paragraph **9.1.2.3.2.** is applied with the statement "ROC reduced to less than 2000" (see **Figure 9.11.**).

NOTE: Display the applicable NACO Digital VFR sectional in order to determine the highest floor of controlled airspace in each sector IAW paragraph **9.1.3.4.1.**.

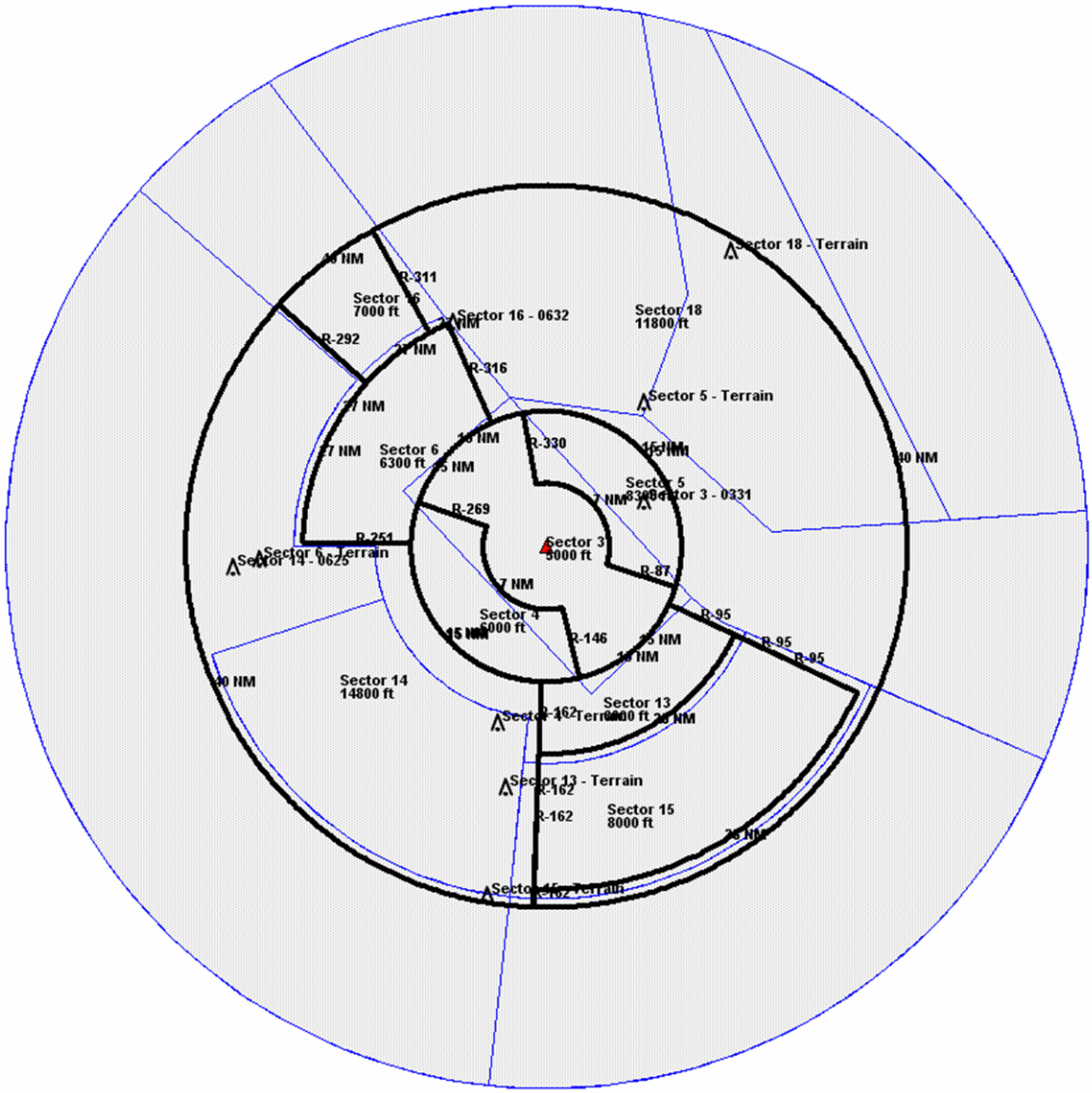
9.2.2.3. Consider restrictions noted on flight inspection reports or ASIS datasheet (i.e. horizontal/vertical NAVAID limitations to include unusable sectors) when determining sector design and when specifying sector altitudes (see **Figure 9.9.**). For example, for the first restriction shown in **Figure 9.9.**, the MIFRAC sector from R-130 clockwise to R-160 beyond 29 NM out to the chart radius shall not be lower than 9000 MSL regardless of the minimum altitude specified by GPD. When flight inspection designates that no coverage exists in an area, annotate the sector as unusable.

Figure 9.9. NAVAID Restrictions.

*** RESTRICTION ***							
Cmpnt	Qual	Svc Date	From	To	Byd	Below	Remark
TACAN	BOTH	08/19/93	130	160	29	9000	
TACAN	BOTH	08/19/93	235	305	19	8000	
TACAN	BOTH	02/02/96	235	305	27	12000	

Figure 9.10. MIFRAC Sectors in GPD Chart Designer with VFR Sectional.

Figure 9.11. MIFRAC Sectors in GPD Chart Designer with MVAC (in blue).



9.3. Chart Documentation and Processing. Create and maintain a procedure package folder containing documentation as follows:

9.3.1. Required hard copy (paper) documentation includes the computer generated MVAC or MIFRAC Report and AF IMT 4332, 20040301,V1 **ATC Chart Signature Page.**

NOTE: GPD will also output hard copy Obstacle Quality and Workspace Quality Reports, however these are intended to assist in aeronautical data resolution. Maintaining hard copies of these outputs is not required.

9.3.2. Also include all hard copy source documentation relating to aeronautical or obstacle data revisions pertinent to the chart to include hard copy correspondence to MAJCOM TERPS function.

9.3.3. Required soft copy (electronic) documentation includes the entire contents of the export folder to include the following files:

9.3.3.1. [workspace name].wks

9.3.3.2. [workspace name].xml

9.3.3.3. [chart name].dbf

9.3.3.4. [chart name].pdf

9.3.3.5. [chart name].shp

9.3.3.6. [chart name].shx

9.3.3.7. [chart name].xml

9.3.3.8. [chart name]-[date]-DEF.ipd

9.3.3.9. [chart name]-[date]-DEF.txt

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

9.3.3.11. [chart name]-Waiver.pdf (when applicable)

9.3.3.12. Expanded Service Volume Request.pdf. The blank IMT is not required to be included in the electronic package, but is mandatory when completed (see paragraph **9.2.1.** Note)

NOTE: During chart export, GPD will prompt the user for a "save to" location for the electronic files. The default is to the drive containing the USAFIPD directory in the "export" folder under the specific chart name. Ensure all required electronic files are selected prior to export and save to the workstation's hard drive.

9.3.3.13. In addition to GPD produced export files, include additional electronic documentation (to include scanned versions of hard copies) relating to aeronautical or obstacle data revisions pertinent to the chart, along with correspondence to MAJCOM TERPS function.

NOTE: Only the signature page (AF IMT 4332, 20040301, V1 ATC Chart Signature Page) must be scanned and saved to electronic media, not the entire Chart Report.

9.3.4. Coordination.

9.3.4.1. Prior to submitting to the MAJCOM TERPS function for review and approval (see paragraph **9.1.** and paragraph **9.2.**), obtain required signatures on the hard copy IMT. Scan and add completed IMT to electronic documentation files.

9.3.4.2. "Zip" all electronic files and upload to the AFFSA FTP site in the appropriate MAJCOM directory under "Uploads" in the "Pending Review" folder. Follow up with an email or phone call to the MAJCOM TERPS function indicating a new file has been uploaded.

9.3.4.3. The MAJCOM TERPS function shall download the zipped "export" files and review the manual edits documented in the export package. When justification/source documentation is adequate, make necessary changes to aeronautical data and/or import manual obstacle changes from the [chart name]-OBS.txt file into GPD prior to chart import. When aeronautical data revisions are appropriate, coordinate with the AFFSA GPD help desk to initiate DAFIF correction.

CAUTION: Following the workflow in this order is necessary to correctly restore the chart (see paragraph **9.1.** Note 1 and paragraph **9.2.** Note 1).

9.3.4.3.1. Import the chart to complete the review process. Ensure that the date/time stamp associated with each page of the exported Chart Report is consistent with the date/time stamp associated with the imported chart. Review chart/sector construction and specified altitudes for compliance, and ensure sector coverage is appropriate (no gaps or overlaps).

NOTE: Validate chart violations and system generated notes against the exported Chart Report file ([chart name].pdf) instead of opening the report from the restored chart in GPD. When the restored chart has violations not included in the exported report, it is likely due to differences in the aeronautical or obstacle data maintained by the export workstation and that on the import workstation. Ensure currency of DAFIF/DVOF and recheck for manual revisions.

9.3.4.3.2. When approving a chart, print the hardcopy AF IMT 4332, 20040301, V1 **ATC Chart Signature Page** included in the export package and sign in the MAJCOM TERPS block. Scan, and add the electronic file to the list of files in the export package. Save an electronic copy of the entire package to removable electronic media for the MAJCOM archives. "Zip" the package and upload to the AFFSA FTP site in the appropriate MAJCOM directory under "Uploads" in the "Review Complete" folder. Follow up with an email or phone call to the unit indicating a new file has been uploaded.

9.4. DELETED.

Chapter 10

MOBILE MICROWAVE LANDING SYSTEMS

10.1. Category I Microwave Landing System (MLS). Develop MMLS procedures using the criteria in AFMAN 11-226(I), Volume 3.

10.2. Mobile Microwave Landing System (MMLS). The minimum glideslope angle should be 3°. The maximum authorized glideslope angle is 6.40°. Angles above 3.60° shall not be established without HQ AFFSA/XOIP approval.

10.2.1. The following definitions apply:

10.2.1.1. MMLS Datum Point. A point on runway centerline, 90 degrees abeam the MMLS elevation station (same as runway crown point for ILS procedures).

10.2.1.2. Elevation Antenna Emplacement Point.

10.2.1.2.1. 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).

10.2.1.2.2. All others. 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).

10.2.1.3. Service Limitation. The azimuth service limitation is 15 miles from the facility, within ± 40½ of the center course. The elevation service limitation is 15 miles from the facility and from 2.5° to 15° (see **Figure 10.1.**).

10.2.2. MMLS Approach Minimums:

10.2.2.1. MMLS Category I. A precision approach procedure with a Decision Altitude (DA) of not less than 200 feet above TDZE.

10.2.2.2. MMLS Category II & III. Reserved.

10.2.2.3. Azimuth Only. Reserved.

10.2.2.4. 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 **10.2.5.** Note. Computed MMLS requires special aircraft avionics and may not support normal civil operations.

10.2.3. System Components. The system components are considered to be the MMLS Azimuth, Elevation, and DME.

NOTE 1: An additional conventional NAVAID may be used to conduct the instrument procedure i.e., missed approach or initial segment, however it is not considered to be a 'system component'. The MMLS does not provide back course azimuth. Course guidance used beyond MAP shall be based on another source.

NOTE 2: 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 ident.

10.2.4. Fixes. All fixes established within the MMLS coverage area shall be based on MMLS DME. Additionally, the following criteria applies:

10.2.4.1. MMLS DME fix error is ± 0.5 miles.

10.2.4.2. Published MMLS fix distances shall be specified to the nearest tenth of a mile.

10.2.4.3. Establish the PFAF by MMLS DME and publish the distance from the DME antenna.

10.2.5. Inoperative System Components. 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 glideslope off/warning flags and loss of course information. At split sites a failure of any component also renders the procedure unusable.

NOTE: 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. When this option is exercised, ensure the appropriate obstacle search areas are evaluated (different fix error involved in identifying a PFAF from another NAVAID). When this is not possible, a precision approach may be flown provided there is another means of identifying the PFAF such as RADAR.

10.2.6. On assault landing strips/zones (see Engineering Technical Letter [ETL] 04-7: C-130 and C-17 Landing Zone (LZ) Dimensional, Marking, and Lighting Criteria), the MMLS will be sited to provide touchdown 300 to 500 feet from threshold. Because of this limitation, the Threshold Crossing Height (TCH) and Wheel Crossing Height (WCH) may be less than normally authorized for a specific aircraft

height group. When developing MMLS procedures supporting assault strips/LZs, the minimum TCH is 30’ regardless of aircraft height group. A TCH of less than 30’ or greater than 60’ is nonstandard and requires waiver processing. WCH violations for assault strips do not require a waiver. When this option is exercised, the procedure is ‘special use’ and paragraph **5.8.** applies. Annotate the procedure ‘NOT FOR CIVIL USE’ and include a note stating the nonstandard WCH condition (i.e. Group 4 WCH 17’).

10.2.7. Threshold Crossing Height (TCH). TCH will vary based on deployment configuration and system siting requirements. The optimum threshold crossing height is 50 feet keeping in mind that VGSI coincidence should be a primary consideration. Except as specified in paragraph **10.2.6.**, AFMAN 11-226(I) Vol 3, paragraph 2.6 and table 2-3 applies.

10.2.8. Procedure Design Limitations. Development of MMLS procedures shall be independent of existing procedures. Only straight-in procedures are authorized. Curved or angled procedures are not permitted.

10.2.9. Missed Approach. Do not use MMLS for missed approach course guidance.

NOTE: MMLS DME can be used in the missed approach segment not to exceed the service volume. When radar is used for the missed approach, annotate the procedure **"RADAR REQUIRED".**

10.3. DELETED.

Figure 10.1. Operational Limits of MMLS (drawing not to scale)

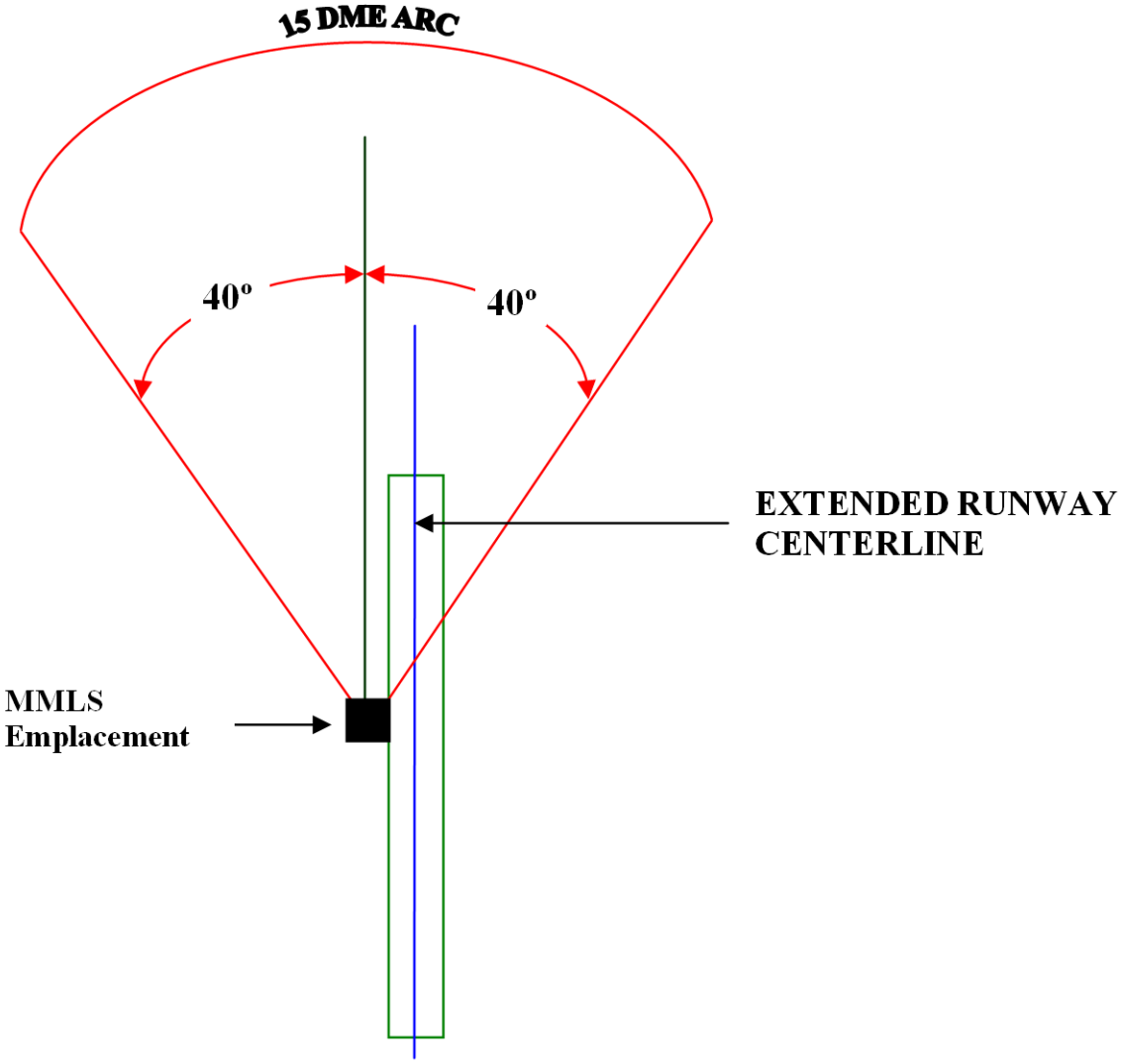


Table 10.1.

DELETED.

Table 10.2.

DELETED.

Table 10.3.

DELETED.

Chapter 11

TERPS AUTOMATION

11.1. Authorized Software. Global Procedure Designer (USAF GPD) is the only TERPS software authorized for use when automating new procedures/charts for publication or review. It shall be utilized in lieu of other evaluation methods when USAF GPD has the capability to develop (in whole or in part) a procedure/chart type unless otherwise directed by AFFSA. Legacy AFTERPS version 12.03 software may only be used to maintain published procedures or active reviews that have not been re-automated using USAF GPD and only for the duration of the USAF GPD transition.

11.1.1. Computer Aided Drafting (CAD) (i.e. AutoCAD®, MicroStation®) or CAD-based applications are not recognized TERPS automation software and may not be used as such. They may however be used as an alternative to mechanical drafting with the following restrictions:

11.1.1.1. CAD shall not be used as an alternative to a full automated evaluation when the procedure/chart type (or portions thereof) is supported by USAF GPD.

11.1.1.2. CAD may be used to depict the 2-D assessment area for a segment/sector, but shall not be used for evaluation of the 3-D TERPS obstacle clearance surfaces with the intent of determining minimums, fix crossing altitudes, and/or minimum segment altitudes.

NOTE: CAD drawings of TERPS procedure segments/sectors require manual validation, on paper maps, in the same manner as those produced by mechanical drafting.

11.1.2. Self-calculating spreadsheets (i.e. Microsoft Excel®) are not recognized as TERPS automation and may not be used as such. They may however be used to perform routine/repetitive mathematical calculations associated with manual evaluations with the following restrictions:

11.1.2.1. Manual evaluation augmented by self-calculating spreadsheets shall not be used as an alternative to a full, automated evaluation when USAF GPD supports the procedure/chart type.

11.1.2.2. Self-calculating spreadsheet results may not be used as the sole source of TERPS analysis (determination of minimum segment altitudes, landing minimums, climb gradients, etc.). When used to augment manual evaluations, include in package documentation enough supporting data, charts, and drawings so that any reviewer can easily determine how the input values were derived (i.e. distance measurements to obstacle, OCS origin elevations, etc.). MAJCOMs must validate and document the mathematical formulas embedded in self-calculating spreadsheets and establish a process to control version currency prior to releasing for MAJCOM-wide use.

11.1.3. Mission/flight planning software (i.e. FalconView™) is not recognized as TERPS automation may not be used as such. It may however be used with the following restriction. Mission/flight planning software may be used to view NGA raster products (CIB/CADRG) in order to visualize the obstacle/terrain environment whenever deemed necessary. This includes downloading and display NGA Electronic Chart Updating Manual (ECHUM) data. However, it may not be used in any capacity for tasks that involve the evaluation of terrain or man-made obstructions against TERPS obstacle clearance surfaces. This includes the use of printed or plotted maps/charts in lieu of appropriate paper products for manual drawings and evaluation.

NOTE: The resolution of CADRG map products is a limiting factor for unrestricted TERPS use. Some maps contain areas where small or fine details are unreadable. This is especially true of (but not limited

to) large-scale maps with close contour lines and congested features. Some obscuration is the result of printer/plotter or paper quality, however resolution issues are not resolved by using photo quality paper and high-resolution printers. This is a result of the compression process used to reduce the size of the scanned map files; therefore even on-screen images are not the same quality as a paper product map/chart.

11.2. USAF GPD Hardware Requirements. See **Table 11.1.**, **Table 11.2.**, and **Table 11.3.**.

11.2.1. Evaluate the adequacy of USAF GPD workstations as a minimum every two years and update as necessary based on the most current hardware requirements.

NOTE: While the system will function on the minimum required workstation, every effort should be made to acquire workstations meeting or exceeding recommended performance to achieve maximum efficiency.

11.2.2. In addition to the hardware requirements, USAF GPD workstations shall have access to the internet via Local Area Network (LAN), an established AFFSA FTP account with the supporting software, and an e-mail account in order to facilitate the transfer of electronic files.

Table 11.1. Recommended USAF GPD Hardware.

RECOMMENDED DESKTOP WORKSTATION:	
OPERATING SYSTEM:	MICROSOFT WINDOWS 2000 PROFESSIONAL, SP 4
CPU	INTEL P4 3+ GHZ, 800 MHZ FSB, 2MB L3 CACHE
RAM	4 GB, DDR400 SDRAM MEMORY, ECC (4 DIMMS)
GRAPHICS CARD	128MB SDRAM, SUPPORT DUAL MONITOR VGA OR DVI/VGA CAPABLE (ENSURE HARDWARE CAPABILITY)
MONITOR	21", MINIMUM 3600 BY 1441 PIXELS CAPABLE
2ND MONITOR	21", MINIMUM 3600 BY 1441 PIXELS CAPABLE
HARD DRIVE	120GB SATA, 7200 RPM HARD DRIVE WITH DATABURST CACHE™ SARC RAID
2ND HARD DRIVE	OPTIONAL
DVD	REQUIRED, DVD+RW/+R
CD-R/W	REQUIRED
FLOPPY DRIVE	REQUIRED
NETWORK CARD	ETHERNET PCMCIA 10/100 BASE T (OR APPROPRIATE LAN INTERFACE CARD)
SOUND	REQUIRED, SOUND CARD AND SPEAKERS
ADDITIONAL SOFTWARE	MICROSOFT OFFICE PRO SUITE, FILE TRANSFER PROTOCOL (FTP)
COLOR PRINTER	REQUIRED, LASER OR INK JET TECHNOLOGY, WITH MINIMUM 600 DPI RESOLUTION. CONFIGURED WITH MAXIMUM RAM, MINIMUM 32MB RAM
COLOR PLOTTER	REQUIRED, INK JET TECHNOLOGY, WITH MINIMUM 600 DPI RESOLUTION. MINIMUM 36X48 (E SIZE) PAPER SIZE. WITH MINIMUM 600 DPI RESOLUTION. CONFIGURED WITH MAXIMUM RAM, MINIMUM 32MB RAM

11.3. Initial USAF GPD adaptation/conversion. Establish initial USAF GPD capability as directed by the MAJCOM-established training/fielding plan. Take the following actions:

11.3.1. Prior to USAF GPD installation;

11.3.1.1. Acquire a computer workstation that meets hardware requirements, and have it configured by local work group managers for use, paying particular attention to the operating system requirements (see paragraph **11.2.**). No Oracle®-based applications can be installed on the workstation at the time of USAF GPD installation.

NOTE: Installation and use of USAF GPD on a system utilizing Windows® XP is not authorized since deviation from OS requirements may have unknown affects. The results of TERPS evaluations developed on a workstation with a non-standard OS are not endorsed or authorized for publication.

11.3.1.2. Establish a recurring requirement (automatic distribution) for those digital aeronautical products required for use (see paragraph **1.3.9.3.** and paragraph **1.5.2.**). Establish and maintain a digital source library for your area of responsibility with best available data (in the following order of precedence):

11.3.1.2.1. DAFIF (mandatory for full automated evaluation)

11.3.1.2.2. DVOF (mandatory for full automated evaluation)

Table 11.2. Minimum USAF GPD Hardware

MINIMUM DESKTOP WORKSTATION:	
OPERATING SYSTEM	MICROSOFT WINDOWS 2000 PROFESSIONAL, SP 4
CPU	INTEL P-IV 2+ GHZ, 512 K CACHE
RAM	1-GB (SDRAM), EXPANDABLE TOTAL 4-GB
GRAPHICS CARD	32MB SDRAM
MONITOR	19", 3600 BY 1441 PIXELS CAPABLE
2ND MONITOR	OPTIONAL
HARD DRIVE	80-GB
2ND HARD DRIVE	OPTIONAL, 40+ GB
DVD	DVD-ROM, REQUIRED. DVD-R/W, OPTIONAL
CD-R/W	REQUIRED
FLOPPY DRIVE	REQUIRED
NETWORK CARD	ETHERNET PCMCIA 10/100 BASE T (OR APPROPRIATE LAN INTERFACE CARD)
SOUND	REQUIRED, SOUND CARD AND SPEAKERS
ADDITIONAL SOFTWARE	MICROSOFT OFFICE PRO SUITE, FILE TRANSFER PROTOCOL (FTP)
COLOR PRINTER	REQUIRED, LASER OR INK JET TECHNOLOGY, WITH MINIMUM 600 DPI RESOLUTION. CONFIGURED WITH MAXIMUM RAM, MINIMUM 32MB RAM
COLOR PLOTTER	REQUIRED, INK JET TECHNOLOGY, WITH MINIMUM 600 DPI RESOLUTION. MINIMUM 36X48 (E SIZE) PAPER SIZE. WITH MINIMUM 600 DPI RESOLUTION. CONFIGURED WITH MAXIMUM RAM, MINIMUM 32MB RAM

11.3.1.2.3. DTED in this order (mandatory for full automated evaluation)

11.3.1.2.3.1. SRTM

11.3.1.2.3.2. DTED LEVEL 2

11.3.1.2.3.3. DTED LEVEL 1

11.3.1.2.4. Vector MAP in this order (required for partial automated evaluation. If none available paper maps are required)

11.3.1.2.4.1. UVMAP

11.3.1.2.4.2. VMAP2

11.3.1.2.4.3. VMAP1

11.3.1.2.4.4. VMAP0

11.3.1.2.5. NACO digital VFR sectionals (required for automated evaluation of charts in CONUS and recommended for automated evaluation of procedures)

Table 11.3. USAF GPD Hardware (Laptop)

LAPTOP:	
OPERATING SYSTEM	MICROSOFT WINDOWS 2000 PROFESSIONAL, SP 4
CPU	INTEL P4 3+ GHZ, INTEL P-IV 1.8 GHZ, 15" ULTRASHARP UXGA DISPLAY
RAM	1-GB
GRAPHICS CARD	64MB
HARD DRIVE	60+ GB 80-GB
2ND HARD DRIVE	OPTIONAL, 20 GB
DVD/CD-R/W	INTERNAL 8-8-8-24X SWDVD/CDRW COMBO DRIVE
FLOPPY DRIVE	REQUIRED
NETWORK CARD	ETHERNET PCMCIA 10/100 BASE T (OR APPROPRIATE LAN INTERFACE CARD)
ADDITIONAL SOFTWARE	MICROSOFT OFFICE PRO SUITE, FILE TRANSFER PROTOCOL (FTP)

11.3.1.2.6. Raster Maps to include CADRGs (ONC/TPC, JOG, 100K, 50K or MIM) and CIBs (see paragraph **11.1.3.** Note).

11.3.1.3. Prepare AFTERPS legacy automation databases (.LOC files) for import into USAF GPD.

11.3.1.3.1. Ensure that there are no ‘non-typical’ obstacle entries (i.e. false obstacles marking DVOF ingest date, recording DTED version etc.) or the process will fail.

11.3.1.3.2. Review the accuracy and completeness of obstacle data, with primary emphasis on those man-made structures and/or terrain + vegetation entries on or in close proximity to the aerodrome (from the CE Map Master Obstacle Chart). Eliminate duplicate obstacles if possible.

NOTE 1: DTED/DVOF obstacles will not be imported from the legacy location file with one exception. Only DTED obstacles that have been edited by the legacy AFTERPS automation (identified in the location file as "DTED ELE MV") ***will*** be imported into USAF GPD. DTED elevations with adjustments for trees (DTED MA) will not be imported. DTED obstacles edited using a text editor or identified in any other way than "manually verified" will NOT be imported.

NOTE 2: USAF GPD will not import any aeronautical data relating to NAVAIDs, aerodrome (ARP), or runway (to include lighting) from the AFTERPS legacy .LOC file. These are imported into GPD directly from digital source.

11.3.1.4. Review/compare aeronautical source data, (surveys, facility/ASIS data sheets, legacy AF Form 3628, Host Nation AIP) and resolve any data disparities.

11.3.2. Install USAF GPD in accordance with the Operations Manual Volume1, Chapter 3. Contact AFFSA USAF GPD Help Desk to obtain a license key. After installation create user accounts IAW Operations Manual Volume 1, Chapter 4 for each individual authorized to use USAF GPD on the workstation, consisting of the users first and last name. Each individual user must log in separately each time USAF GPD is used. Common accounts/shared passwords are not authorized.

11.3.3. Prepare USAF GPD for use. Establish the globalspace and required workspaces. Follow the expected workflow outlined in **Table 11.4.** (also see Operations Manual Volume 1, Table 2-1). The steps outlined are for the most part self explanatory, however certain critical steps are explained as follows;

CAUTION: Failure to follow the workflow sequence described in **Table 11.4.** may result in loss of data.

Table 11.4. USAF GPD Initial Adaptation Workflow

Workflow	Action
1. Import current DAFIF data	Add to USAF GPD with the USAF Geospatial Data Manager Reference OM Volume I – *Import DAFIF*
2. Import current DVOF data	Add to USAF GPD with the USAF Geospatial Data Manager Reference OM Volume I – *Import DVOF*
3. Identify the Airport/Aerodrome of Interest	For the Airport/Aerodrome of interest identify available products: - Legacy Location files - Terrain products, DTED or DEM - Additional raster and vector products for geographic context during the procedure or chart design
4. Import AFTERPS legacy location files	Add to USAF GPD with the USAF Geospatial Data Manager. This only needs to be done once per workspace. Reference OM Volume I – *Import DVOF* ??*The Manual Obstacle Import Process*
5. Import terrain data	Add to USAF GPD with the USAF Geospatial Data Manager Reference OM Volume I – *Import Terrain D*ata
6. Import raster and vector products for geographic context	Add to USAF GPD with the USAF Geospatial Data Manager Reference OM Volume I – Import Vector Data and Import *Raster Data*
7. For the Airport/Aerodrome of Interest, create a workspace.	Create with the USAF Geospatial Data Manager Reference OM Volume I – *Create a Workspace*
8. Obtain accurate information about the aeronautical assets in the environment	Obtain Legacy AF Form 3628 Data Verification for the Airport/Aerodrome of Interest Or Use other accepted data source, for example, survey , FAA ASIS data sheet
9. Evaluate completeness and accuracy of aeronautical data	Determine the quality of the aeronautical data in the workspace using the USAF Geospatial Data Manager Reference OM Volume I – *Aerodrome and Runway* *Quality Report* and *NAVAID Quality Report*

Workflow	Action
10. Reconcile the information in hand with the information in DAFIF. Enter corrections.	Correct and supplement aeronautical data in USAF GPD using the USAF Geospatial Data Manager Reference OM Volume I – *Manual Changes to Aeronautical and Obstacle Data* and *Database Forms*
11. Supplement the aeronautical data with information necessary for instrument procedure or chart design.	Supplement aeronautical data in USAF GPD using the USAF Geospatial Data Manager Reference OM Volume I – *Supplementing Published Data* and *Database Forms*
12. Evaluate completeness and accuracy of obstacle data and correct with the information in hand	Correct obstacle data in USAF GPD using the USAF Geospatial Data Manager, the USAF Instrument Procedure Designer or the USAF ATC Chart Designer Reference OM Volume I – *Obstacle Quality Report* and *Database Forms – Obstacle Form* *This activity may be done in conjunction with Instrument Procedure or Chart Design to limit corrections to obstacles that affect minimum altitudes.

11.3.3.1. Step 4 - Import AFTERPS legacy location files. Ensure the location file contains the most current obstacle edits/updates prior to initiating the import process. During initial GPD adaptation, there will normally be no duplicate or updated obstacles. Review the new obstacles list and uncheck any that you do not wish to import (i.e duplicated or deleted obstacles). Spot elevations/contour lines without additional allowance for trees may be equal to the terrain model when high quality DTED (Level 2/SRTM) is imported. Unless the point has significant impact on the procedure and there is high confidence in the accuracy of the data, do not import obstacles from AFTERPs legacy that are terrain-based.

CAUTION: When you accept to import new obstacles (leaving box checked and selecting OK), the entire group of obstacles will be entered into the globalspace and cannot be removed except by creating a workspace and deleting them individually.

11.3.3.2. Step 10 and 11 – Evaluate accuracy and reconcile aeronautical data discrepancies/add supplementary data as required. All data imported from DAFIF shall be verified against source to confirm accuracy. DAFIF data includes aerodrome location/magnetic variation, NAVAID, runway (to include lighting), airspace (controlled and SUA), and airways (ATS Routes). If doubt exists to the accuracy of the source data, request a survey to validate the data. MAJCOM TERPS is the OPR for initiating survey requests (see AFI 14-205, ***Identifying Requirements for Obtaining and Using Cartographic and Geodetic Products and Services***). Additionally, some values required for TERPS analysis are not contained in DAFIF and must be added as supplementary data. Report coordinates in WGS-84. The following data must be resolved in Data Manager prior to procedure development.

11.3.3.2.1. Aerodrome Assigned [magnetic] Variation.

11.3.3.2.2. Runway Physical/Landing/Takeoff/Displacement lengths. Ensure the data accurately reflects the actual runway configuration, especially when there are threshold displacements. Pay particular atten-

tion to takeoff lengths and DER location, since the DAFIF value may include non-load bearing overruns. Also make sure that the displaced threshold elevations are entered. ***Failure to correct these values may result in incorrect evaluation of procedures.***

Figure 11.1. Runway Physical/Landing/Takeoff /Displacement Lengths.

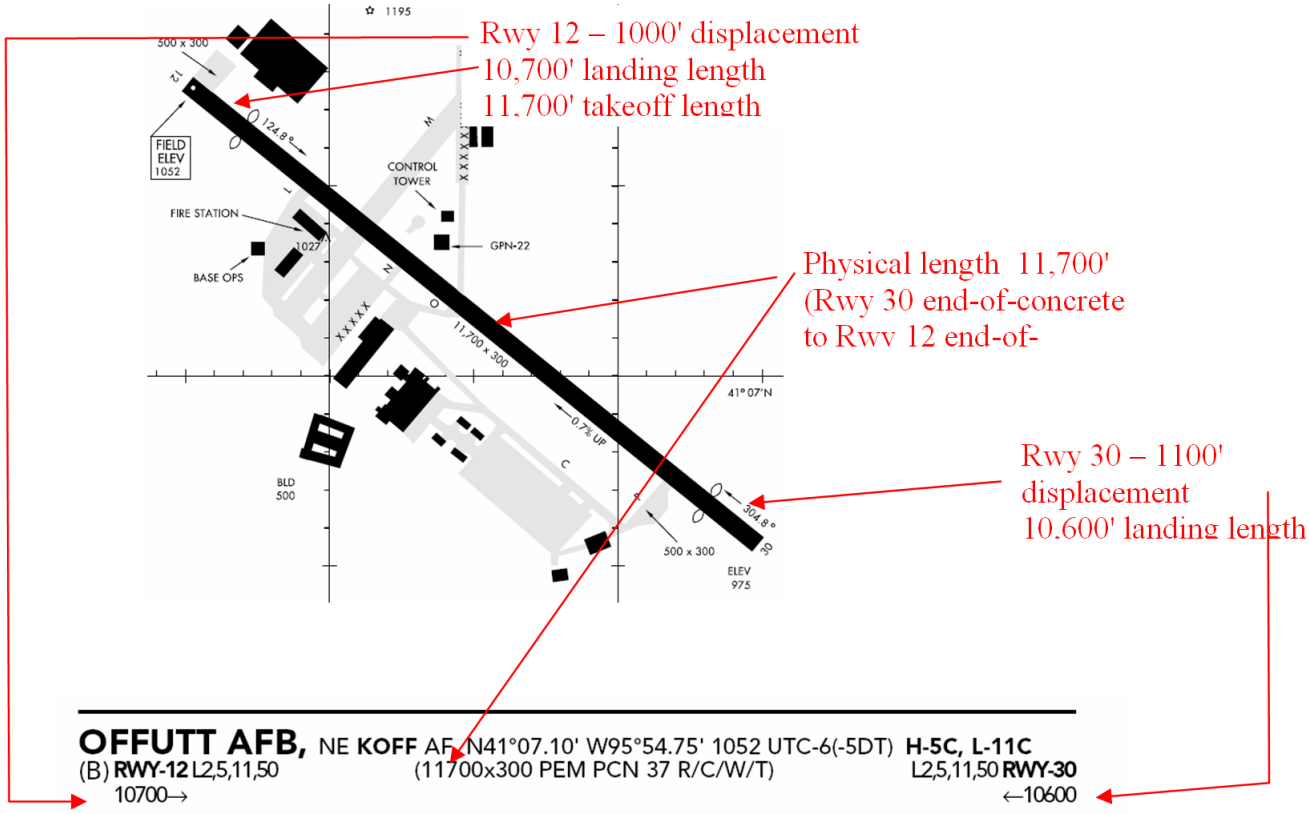
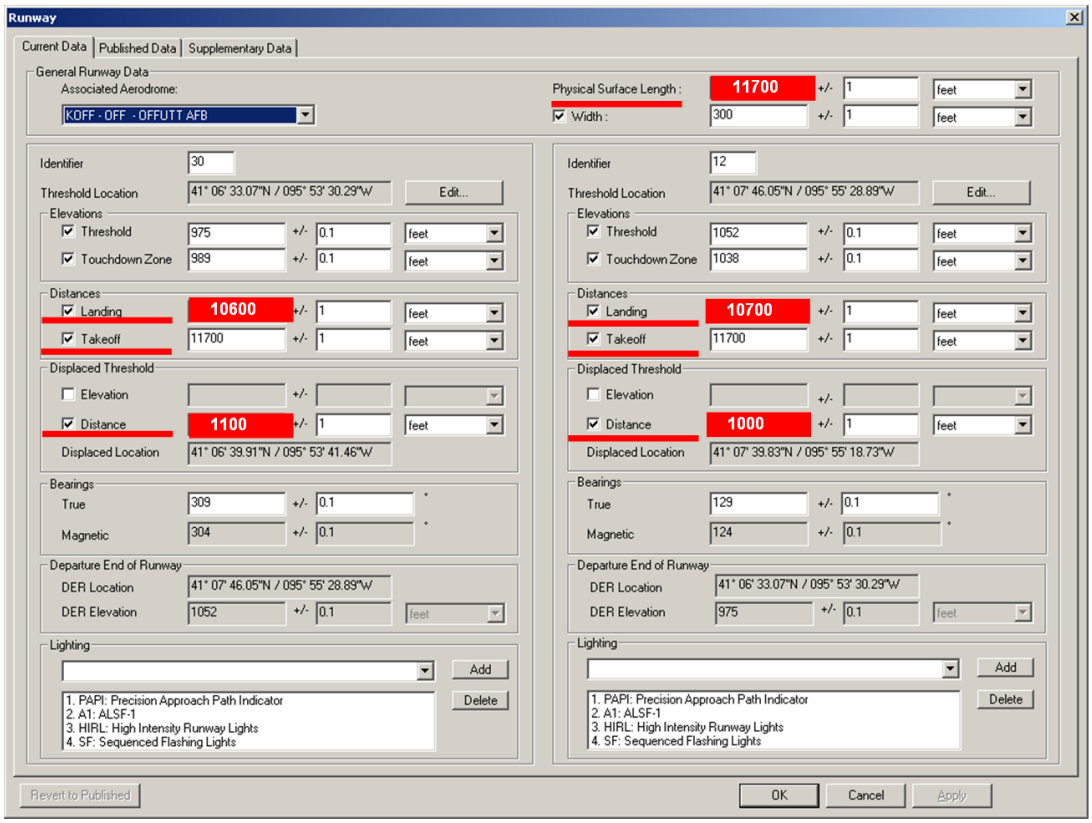


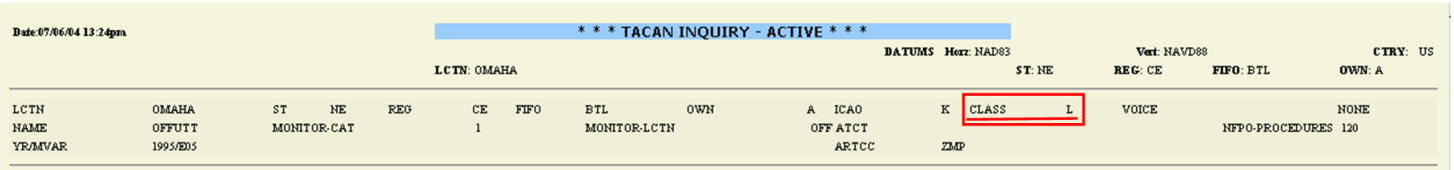
Figure 11.2. Runway Physical/Landing/Takeoff /Displacement Lengths in GPD.



11.3.3.2.3. Runway/lights supplementary data. Enable supplementary data **<u>for each runway</u>** and add RVR availability if appropriate. Coordinate with local Airfield Manager and/or CE to determine the runway capability based on runway markings, etc. (i.e suitable for circling only/non-precision/CATI/CATII/CATIII precision). Also enable the supplementary data for each visual glidepath system, adding TCH, VGSI angle and the light bar(s)distance from threshold (as appropriate). Add supplementary approach light length if the system is non-standard.

11.3.3.2.4. Omni-directional NAVAIDs. Ensure that the antenna elevation is entered and correct. Check the Radio Class (see FAA Order 8260.19, Chapter 2) to ensure the standard service volume is correctly evaluated. Do not edit the frequency protected service volume unless valid source data indicates that it is less than standard. Ensure the assigned NAVAID variation is correct.

Figure 11.3. Omni-directional NAVAID Radio Class.



11.3.3.2.5. Airport NAVAIDS. Check all ILS glideslope and localizer data for accuracy (see **Figure 11.3.**). Pay particular attention to the localizer coordinates, which determine its actual position (distance and "relative to" point provided for reference/documentation only). Ensure the localizer course is entered as a true value (vice magnetic). Normally this value is the same as the runway true azimuth but may be different, especially if the localizer is offset. Ensure that the assigned variation of the localizer is the same as the aerodrome assigned variation. For glideslope, pay particular attention to the distance and "relative to" point (should normally be after threshold).

Figure 11.4. Airport NAVAIDs (example ILS).

Date:07/06/04 13:36pm | * * * ILS INQUIRY - PENDING * * * | DATUMS Horz: NAD83 Vert: NAVD88 | CTRY: US

AIRPORT: OFFUTT AFB | ARPT-ID: KOFF | RWY: 30 | LCTN: OMAHA | ST: NE | REG: CE | FIFO: BTL | OWN: A

* * * AFIS DATA * * *							
IDENT	OFF	GLA	N41-06-52.44	GS-OFF	R499	GS-LC-DIS	9411
RW-BRG	309.13	GLO	W095-53-52.45	GS-OM-DIS	26932	LC-OFF	
FREQ	109.500	GS-ANG	2.80	GS-TH-DIS	1412	LC-FCB	309.13 2
MVAR	1995/E05 3	GS-WID	0.70	TH-HGT	975	LC-BCB	129.11
CAT	I	GS-HGT	964.4	RE-HGT	1052	LC-WID	3.71
		R-LDG-LGTH	10624				

* * * LOCALIZER * * *		(DFL CODE - ILS/L)					
ANT LAT	N41-07-47.27	XMTR	DUAL	LOC-RE	199/ 0.033	LCW-TAIL	YES
ANT LON	W095-55-31.95 1	EQUIP-TYPE	WILCOX	LOC-TH	10823/ 1.781	LCW-FT-TH	701
ELEV	1050.5	STBY-POWER	G	LOC-IM		DATE-COMM	06/28/90
ANT-TYPE	LOG-PER	ESV	N	LOC-MM		DATE-RECON	
DUAL-FREQ	NO	RESTRICTED	N	LOC-OM		SURVEY-ACCY	6
US-DIST: FC	5547/ 18.0	BC		LOC-FAF	36343/ 5.981	VOICE	NONE
CLRNC-CVG-FC	90/35 150/35	BC		MON-AL-WID	W 4.34 N 3.08	REC TYPE	
CKPT-DESC: FC	OFF TAC 4.6 DME/RADAR			BC			
LOC-WIDTH-MX-ALERT:	4.09/ 3.33			LOC-AL-MX-ALERT:	9uA	ROLLOUT:	N
LOC-WIDTH-INITIAL:	4.23/ 3.19						

* * * GLIDE SLOPE * * *		(DFL CODE - ILS/G)					
ELEV	964.4	XMTR	DUAL	DIST-TH-PT-C	857.6/ 0.141	GS-ANT-OFF	R499
ANT-TYPE	NULL-REF	EQUIP-TYPE	WILCOX	GS-TH	1412 / 0.232 4	MON-AL-ANG	H 3.08/L 2.59
CL-ELEV-ABM	975.3	FREQ	332.600	GS-IM		DATE-COMM	06/29/90
TCH	58.1	ESV	N	GS-MM		DATE-RECON	
ELEV-FOR-CALC	SITE	RESTRICTED	N	GS-OM		SURVEY-ACCY	6
AFIS-CORDS	ANTENNA	GPI-TH	1187.1	GS-FAF	26932/ 4.432	STBY-POWER	G
ANT: LAT	N41-06-52.44	RPI-TH	1188.8	AIM-PT:LAT	N41-06-48.61	CBP-TH	N
LON	W095-53-52.45			LON	W095-53-56.57		

* * * AIRPORT DATA * * *	
ARP-LAT	N41-07-09.57
ARP-LON	W095-54-30.62
FIELD-ELEV	1052.1
TH-LAT	N41-06-33.08
TH-LON	W095-53-31.33
TH-ELEV	975.4
RE-LAT	N41-07-46.03
RE-LON	W095-55-29.94
RE-ELEV	1052.1
RWY-LGTH/WIDT	11701/300
DSPLCD-TH-DIST	1077
DSPLCD-TH-LAT	N41-06-39.80
DSPLCD-TH-LON	W095-53-42.24
DSPLCD-TH-ELEV	975.4
RWY-LDG-LGTH	10624
TDZ-ELEV	989.0
FAR PART 139	No

DECISION-HEIGHTS:		
DH	DIST/RALT	
(100)	0	0
(150)	0	0
(200)	0	0
PERFORMANCE-CLASS		I / C /
FPC PUBLISHED		

GENERAL DATA:	
YR/MVAR	1995/E05 3
ICAO	K
BC-STATUS	

1. Localizer location (geodetic coordinates). 2. Localizer front course bearing. 3. Airport/localizer assigned magnetic variation. 4. Glideslope location (distance after threshold).

11.3.3.2.6. Add all ASR/PAR Radar data as needed to support required procedures/charts (DAFIF does not include any Radar data).

11.3.3.2.7. Verify aeronautical data used meets Radio Technical Commission for Aeronautics (RTCA) standards for aeronautical integrity. When available source data does not meet these standards or it is unclear whether these standards have been met, attempt to obtain compliant source data. If this is not pos-

sible, use the best available data, and annotate in the procedure the efforts taken to resolve the discrepancy. GPD will provide a operational warning when RTCA standards have not been met, (waiver/justification not required). Ensure the following critical elements are reported to the specified accuracy:

***NOTE*:** This list is not all inclusive, however it contains those data elements that most often will affect procedure development.

11.3.3.2.7.1. Terminal VHF/UHF NAVAIDs location – report location to 1/100th of a second (geodetic coordinates +/- 0.01). Elevation – not to exceed 100' vertical.

11.3.3.2.7.2. Precision NAVAID (ILS/MLS) components - report location to 1/100th of a second (geodetic coordinates +/- 0.01). Elevation –not to exceed 1' vertical.

11.3.3.2.7.3. Aerodrome Reference Point - report location to 1/10th of a second (geodetic coordinates +/- 0.10). Elevation - not to exceed 1' vertical.

11.3.3.2.7.4. Rwy thresholds - report location to 1/100th of a second (geodetic coordinates +/- 0.01). Elevation - not to exceed 1' vertical.

11.3.3.2.7.5. Threshold crossing height – Elevation – not to exceed 1' vertical.

11.3.3.2.7.6. Fixes/waypoints – report location to 1/100th of a second (geodetic coordinates +/- 0.01).

11.3.3.2.7.7. Declination and magnetic variation (to include aerodrome and NAVAID assigned variation) – report to 1/10th degree (+/-0.10 degrees).

11.3.3.2.7.8. Course/bearing (to include runway bearing, localizer alignment) – report courses to 1/100th degree (+/- 0.01 degrees).

11.3.3.2.7.9. Length/distance (to include runway lengths/widths, distances related to ILS/MLS component – report to distances to 1' (+/- 1').

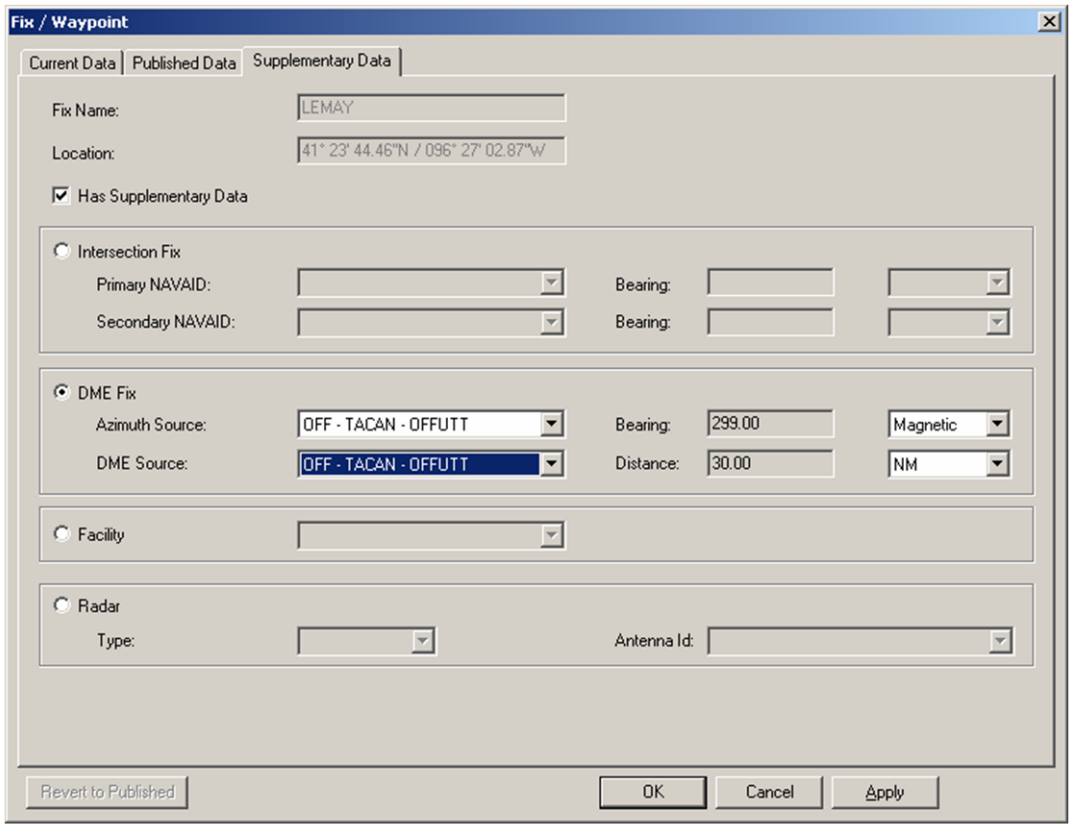
11.3.3.2.7.10. Angular data (to include ILS /MLS Precision RNAV Glidepath Angle, visual descent angle) – report to 1/100th degree (+/- 0.01 degrees).

11.3.3.2.8. Add supplementary Named Fix/Waypoint data. Fix data imported from DAFIF does not include any data other than it's geodetic location. TERPS evaluation requires additional data to correctly determine fix error. Unless a named fix is intended solely for 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 7350.7, *Location Identifiers,* or from source copy FAA Form 8260-2, *Radio Fix and Holding Data*. Named fixes without supplementary data added will be marked "RNAV only" and will only be displayed when building RNAV procedures.

Figure 11.5. Fix Data for 'LEMAY' from FAA Order 7350.7, Location Identifiers.

LEMAY NE	OFF*T*299.ØØ/3Ø.ØØ 41-23-44.46N Ø96-27-Ø2.87W

Figure 11.6. Fix/Waypoint Supplemental Data for 'LEMAY' in Data Manager.



11.3.3.3. Step 12 - Evaluate the accuracy and completeness of obstacle data. To facilitate this process GPD will produce an obstacle quality report at both the workspace level in Data Manager and at the procedure level in Procedure Designer. Resolving obstacle quality at the procedure level is authorized. These reports detail obstacles with quality issues (for example those with unknown height above MSL; height above MSL is 0.0; unknown vertical accuracy; vertical accuracy of 0.0; unknown horizontal accuracy; horizontal accuracy less than 1m; accuracy of height above MSL is greater than 25% of obstacle AGL height; obstacles that are defined as underground when reconciled with the terrain, and/or those with horizontal accuracy based on latitude/longitude.

11.3.3.3.1. For those obstacles located in the procedure obstacle search areas (evaluated obstacles) with an unknown MSL height, an MSL height of zero, or an height defined as underground when compared with the terrain model, contact the data source to determine the actual MSL height of the obstacle. If the obstacle height cannot be determined from the data source, attempt to identify the obstacle by map search or by contacting NGA for imagery analysis. Annotate in the user entered notes the remark "CONTROLLING OBSTACLES CANNOT BE VERIFIED IN [APPLICABLE SEGMENT(S)]". Document actions

attempted to resolve the discrepancy and process the procedure as non-standard, special use. If developed to support an FTIP review, include the remark in the review letter.

11.3.3.3.2. For those obstacles that fall in the procedure obstacle search areas (evaluated obstacles) derived from a digital source that does include accuracies, but the accuracies are unknown, missing or zero, contact the data source to determine the actual vertical and horizontal accuracy of the obstacle (see **Figure 11.7.** and **Figure 11.8.**). If the accuracies cannot be determined from the data source, attempt to identify the obstacle by map search and apply the values from **Table 11.5.**. If all possibilities have been exhausted, apply the worst-case horizontal/vertical accuracy from **Table 11.5.**, and annotate actions taken in the user entered notes. The procedure may be published and processed as standard.

11.3.3.3.3. For those obstacles located in the procedure obstacle search areas (evaluated obstacles) derived from legacy AFTERPS location files, the source data does not include accuracies therefore the horizontal and/or vertical accuracies must be declared. At the procedure level, when AFTERPS-legacy database obstacles are identified in the evaluated obstacles, determine how the obstacles were originally determined. Those obstacles that were determined from the CE map MOC search shall be assigned accuracies based on CE maps (see **Table 11.5.**). Likewise, assign accuracies consistent with the map used for those obstacles derived from the 0 - 10 NM, 10 - 30NM, and 30 - 60 NM etc. MOC searches.

NOTE: Accuracies derived from any source may be reduced to 250’ (75m) horizontal and 50’ (15m) vertical when confirmed by flight inspection flyby.

Figure 11.7. Adjustment of Obstacle Height Based on Vertical Accuracy.

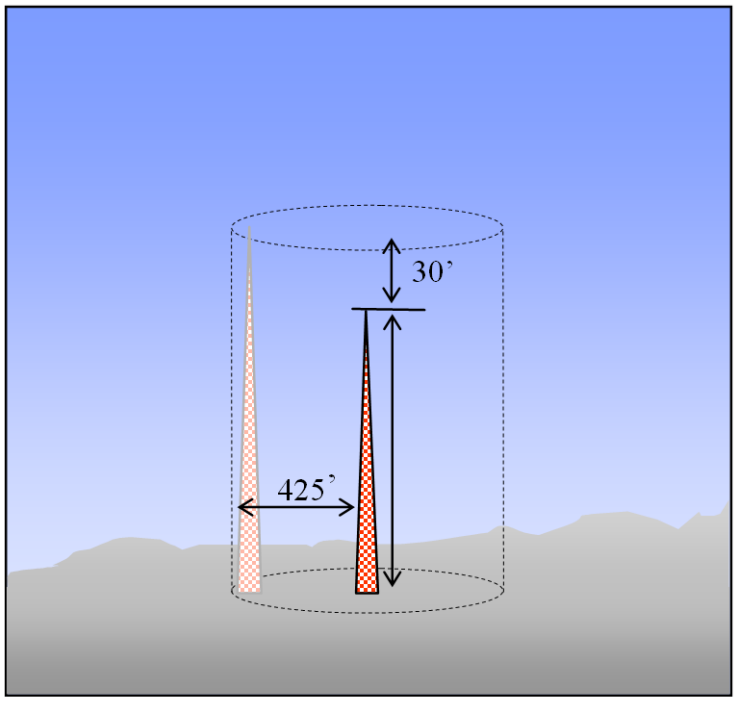


Table 11.5. Horizontal and Vertical Accuracies as Determined by Map Source.

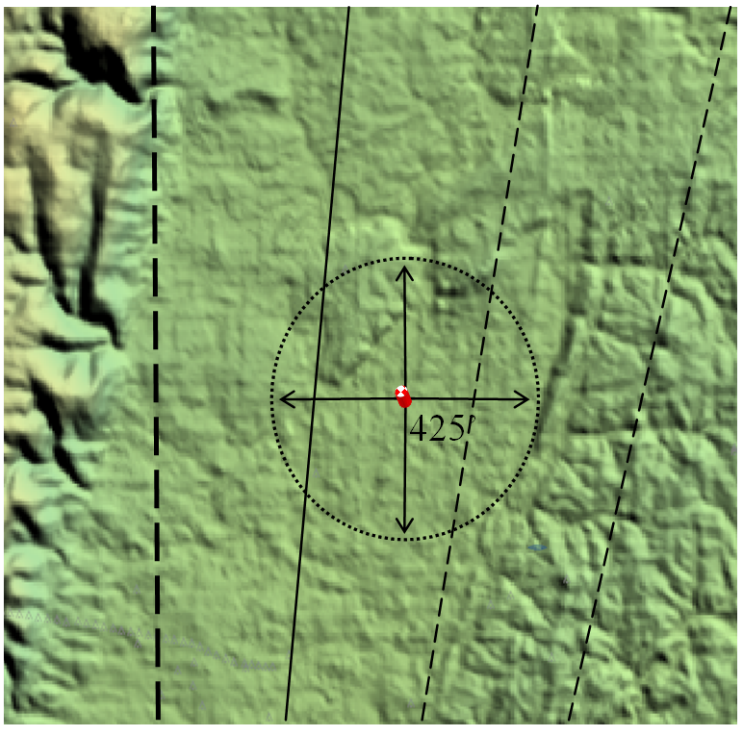
MAP TYPE	HORIZONTAL ACCURACY	VERTICAL ACCURACY
USAF Civil Engineering Map [1] or Geobase CIP foundation / digital equivalent	40’ (12m)	20’ (6m)
USGS Topographical 1:20,000/ 1:24,000/1:25,000/ 1:100,000	40’ (12m)	20’ (6m) [3]
USGS Topographical 1:62,500/1:63,360	150’ (75m)	50’ (15m) [3]
USGS Topographical 1:250,000	1000’ (300m)	100’ (30m) [3]
World Aeronautical Chart/NGA Operational Navigation Charts (1:1,000,000)	3400’ (1000m)[2]	500’ (150m)
VFR Sectional/ NGA Tactical Pilotage Chart (1:500,000)	1800’ (550m) [2]	250’ (75m)
VFR Terminal Area chart/ NGA Joint Operations Graphic (1:250,000)	1000’ (300m) [2]	250’ (75m)

[1] See FAA ORDER 8260.19 Appendix 2 for FAA Airport Obstruction Chart (OC) accuracies.

[2] Horizontal accuracy may be reduced by ¾ for terrain features. The larger accuracy applied to manmade obstacles is to account for displacement from application of "cartographic license" allowed by IACC specifications.

[3] When obstacles or mountain peaks are specifically marked by a spot elevation, the vertical accuracy changes to 3’ (1m).

Figure 11.8. Adjustment of Obstacle Location based on Horizontal Accuracy.



11.4. Additional GPD Considerations/Miscellaneous.

11.4.1. For manual additions/revisions to aeronautical and/or obstacle data in GPD, geodetic coordinates must be entered in WGS-84. If source data is in another datum, coordinates MUST be converted prior to use.

NOTE: Differences between WGS-84 and NAD-83 are so slight that there is no reason to convert NAD-83 coordinates for most locations in the contiguous United States. There are locations, however (i.e. extreme South or Southwestern states), where the difference is significant enough to warrant conversion.

11.4.1.1. When entering manual obstacles after initial GPD adaptation, apply horizontal and vertical accuracies based on the data source as described in paragraph **11.3.3.3.**. If the accuracies come from an OE/AAA case study or from an airfield survey, apply the declared accuracies. If the accuracies cannot be determined from the data source, attempt to identify the obstacle by map search and apply the values from **Table 11.5.** If all possibilities have been exhausted, apply the worst-case horizontal/vertical accuracy from **Table 11.5.**, and annotate actions taken in the user entered notes. The procedure may be published and processed as standard.

11.4.2. Touchdown zone elevation may be surveyed and reported to the nearest 1/10th or 1/100th foot, however this value must be rounded to the nearest whole foot for use by GPD (for example 989.42 surveyed must be entered as 989.0). Changing the accuracy (i.e. +/ 1 ft instead of +/- 0.01 ft) does not produce the required outcome. Failure to comply with this guidance will have an undesired affect on approach minimums.

11.4.3. When using GPD to develop procedures to support FTIP review and the host nation only publishes the Reference Datum Height (RDH) in the AIP, take the following actions;

11.4.3.1. ICAO/NATO criteria. Enter the host-specified RDH in the ILS supplementary data. The runway crown elevation abeam GS antenna is not required, however, the GS Antenna elevation and distance GS antenna to threshold must be entered even when an RDH is specified. Neither value has any impact on the design of the procedure; therefore the values entered are not important. Annotate in the procedure remarks actions taken when ‘false’ values are entered with rationale for this action.

11.4.3.2. USAF criteria. RDH may be entered, but the TCH/GPI/RPI is still calculated based on the values entered. Crown elevation is not a required value; if it's not entered, GPD uses the GS antenna elevation for GPI/RPI calculations. To calculate other values, first use the following formula to calculate GPI:

GPI = TCH/(tan)GS

11.4.3.2.1. Using the host nation threshold elevation, TCH and GS angle, and the calculated GPI, enter the following data into the ILS data in Data Manager:

11.4.3.2.1.1. Enter threshold elevation for GS antenna site elevation.

11.4.3.2.1.2. Enter the calculated GPI Distance as the GS antenna to threshold distance.

11.4.4. GPD by default applies rapidly dropping terrain calculations when determining TCH/RPI/GPI. When source data indicates that relatively smooth calculations were used, edit the ILS glideslope data in Data Manager by changing the glideslope antenna ground elevation to equal the surveyed runway crown elevation. Annotate steps taken in the user defined notes and provide rationale for this action.

11.4.5. GPD utilizes terrain data from DTED/SRTM/DEM and obstacle data from NGA DVOF and legacy AFTERPS location files. The location file is usually the only source of data relating to on- or near-aerodrome obstructions at USAF locations. In order to continue to consider these "close-in" obstructions, or when establishing an entirely new TERPS program (for example at a contingency location), develop and/or maintain a master obstacle chart centered on the aerodrome reference point and extended to at least the base perimeter or to the extent of the CE maps/airport obstruction charts (OCs) or topographical map equivalents. Digital GIS or Geobase Common Installation Picture (CIP) equivalents to E- and C- series CE maps may also be used for obstacle searches/master obstacle charts. Enter identified obstacles in Data Manager, and apply horizontal/vertical accuracies in accordance with **Table 11.5.**. The search area shall be constructed and evaluated as follows;

11.4.5.1. Construct a line originating at the ARP extending out to the map edge. Repeat the line in 5-degree intervals for 360 degrees.

11.4.5.2. Construct concentric circles, each centered on the ARP, in intervals of 0.25 NM (.25, .50, .75, 1.0, etc.) outward to the map edge.

11.4.5.3. Each 5-degree by 0.25 NM splay area represents an area for obstacle search/identification. Identify the object with the highest MSL elevation within each splay area and record as a new obstacle. *Obstacle shadowing is not authorized.* For example, if in the first splay area from ARP the highest object is 150’ MSL, you may not disregard a 140’ MSL object in the following splay along the same 5 degree interval. Exception: Objects with an MSL elevation below the lowest threshold elevation may be excluded. If there are no above ground objects in the splay higher than the lowest threshold elevation, continue out the 5-degree splay until finding an object that is higher.

***NOTE 1*:** GPD differs from the legacy software in that the terrain model is considered separately from man-made obstacles. DO NOT enter bald terrain spot elevations or elevation contours as a manual obstacle unless significantly higher than the digital terrain data.

***NOTE 2*:** GPD has the capability to include a vegetation allowance to the terrain model, however the increased MSL elevation for trees is not applied within 1.5 NM around each runway threshold. Any vegetated (tree covered) area in an obstacle identification splay with an AGL tree height + MSL contour elevation higher than the lowest threshold elevation shall be added as a manual obstacle. In order to account for vegetation and growth, determine the maximum growth of the tallest tree species indigenous to the area (contact State Forestry Division or Host Nation equivalent). If desired/necessary, procedure specialists may elect to reduce the maximum tree height if a lower height can be verified by a qualified source (i.e. Forestry Dept. confirms vegetated area does not include largest indigenous tree species, or qualified survey source determines actual tree height). When the latter option is chosen, consider annual rate of growth and update the obstacles height on a recurring (annual) basis.

***NOTE 3*:** The intent of this criteria is not to construct new MOCs during GPD adaptation if there is an existing MOC supporting the legacy AFTERPs location file. Those DTED postings that were correctly verified and edited using the legacy software will be added to the globalspace when GPD imports the location file. Continue to maintain the existing MOC based on this criteria and consider all new construction/vegetation growth.

11.4.5.4. Adverse assumption shall be used to consider the most critical height of un-measurable obstacles (trees, power poles/lines, etc.). When assumptions are made, document source(s) used to apply assumed values and retain in TERPS records. When evaluating contour lines to determine the MSL elevation of an above ground object where only the AGL height is known, use the following technique to take care of the hilltops and draws: Use one foot less than the next appropriate terrain line (map contour interval is 20 feet. The highest contour line identified within a section is 300 feet. The MSL elevation value would be 319 feet).

11.4.6. GPD will raise a warning message whenever 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 source (i.e. DTED1, DTED2, SRTM or DEM in CONUS). After all options are exhausted and there is still no digital terrain coverage in the area, take the following steps to ensure the terrain environment is properly considered;

11.4.6.1. Determine the segment/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"(see **Figure 11.9.**, **Figure 11.10.** and **Figure 11.11.**).

11.4.6.2. Evaluate terrain in the area identified and add obstacles to Data Manager as necessary. Use of VMAP products is authorized (with preference to the best available source as defined in paragraph **11.3.1.2.**) 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/segment being evaluated and the relative position of the area with incomplete terrain coverage. Add horizontal/vertical accuracies equivalent to NGA 1:250,000 JOGs for VMAP1/VMAP2 and equivalent to a WAC chart for VMAP0 (see **Table 11.5.**). After adding obstacles,

re-validate segment/sector controlling obstacles for those procedure/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 1*:** Adverse assumption shall be applied between contour lines (see paragraph **11.4.5.4.**). Add vegetation allowance to MSL height as appropriate (see paragraph **11.4.5.3.** Note 2).

***NOTE 2*:** If no VMAP products are available, a terrain analysis must be conducted on paper copy maps and the results documented. CADRG maps are not authorized for this map search (see paragraph **11.1.3.** Note).

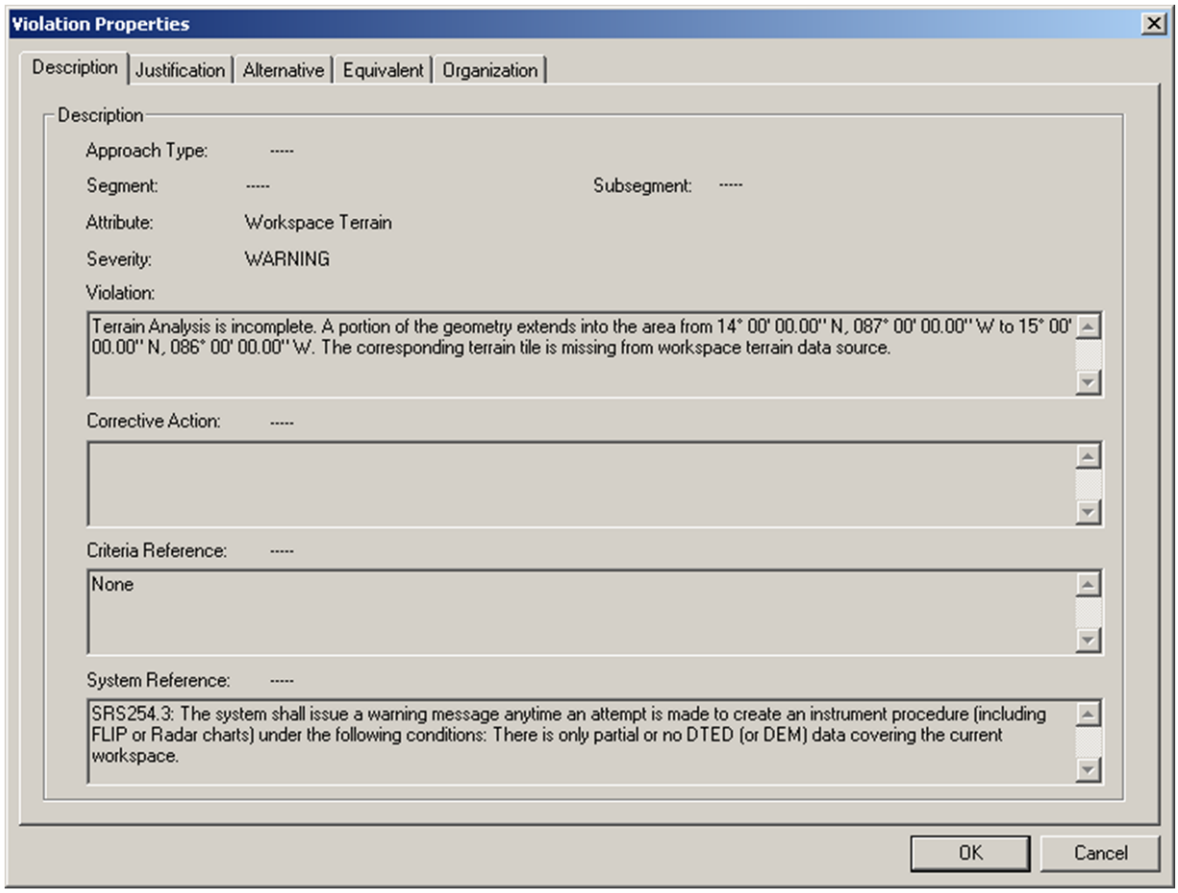
11.4.7. TERPS Development Software Problem Reporting. Timely software problem reporting is essential to ensure flight safety and the software's continued ability to support the USAF TERPS mission. DO NOT attempt to develop local or MAJCOM-specific 'work-arounds'.

11.4.7.1. Responsibilities:

11.4.7.2. The unit shall notify their MAJCOM as soon as they become aware of a suspected problem with the TERPS automation software.

11.4.7.3. MAJCOMs shall validate that the software problem exists and that the problem is not operator induced. Once the MAJCOM has verified the problem as legitimate, the MAJCOM shall immediately notify the AFFSA GPD

Figure 11.9. GPD Terrain Analysis Incomplete Warning.



help desk. Provide the help desk with a full description of the steps that lead to the problem and provide the procedure export package if available.

11.4.7.4. MAJCOMs shall provide notification of all TERPS development software problems and solutions, as provided by AFFSA/XOIP, to all users under their command and provide solutions.

Figure 11.10. Area with Missing Terrain Data.

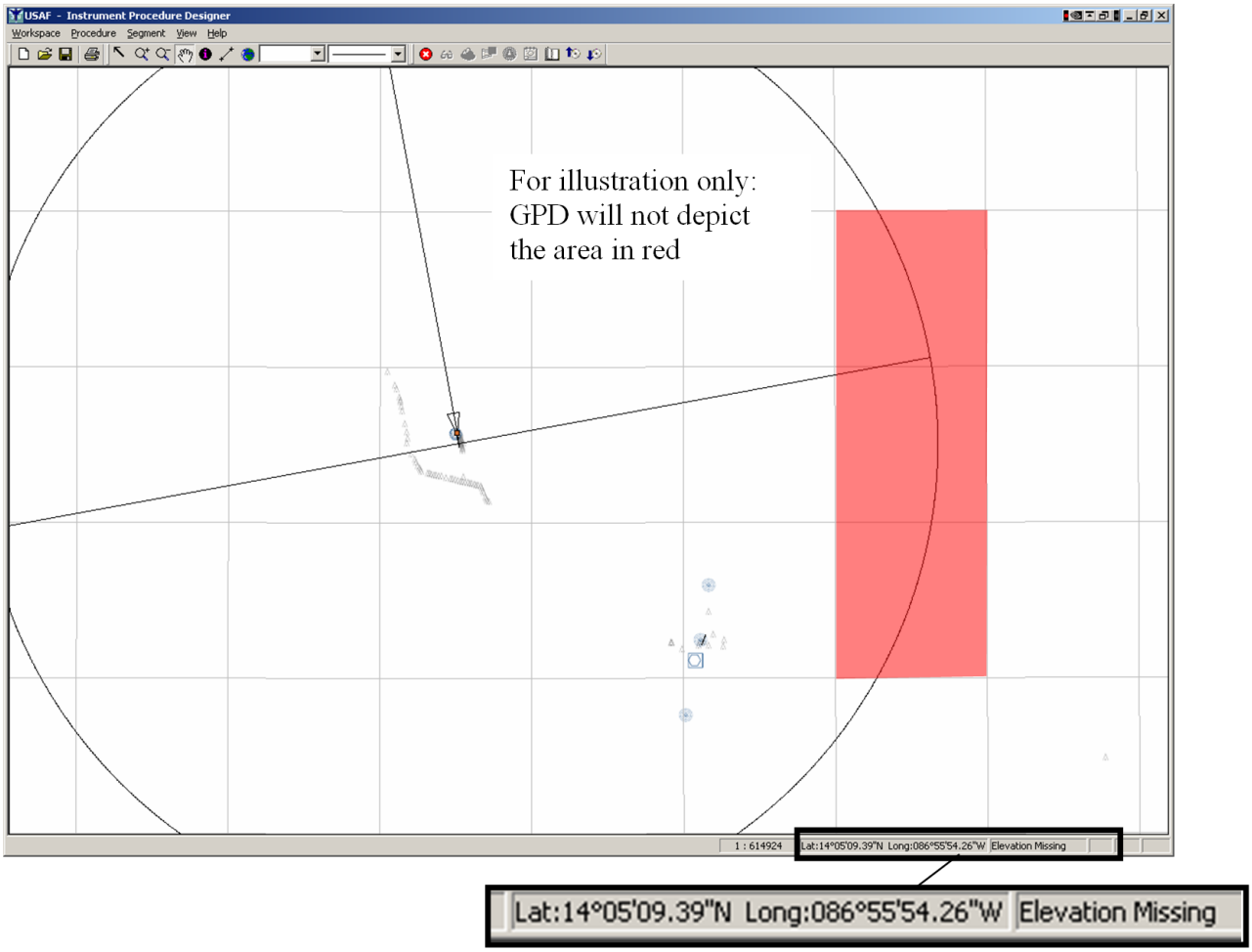
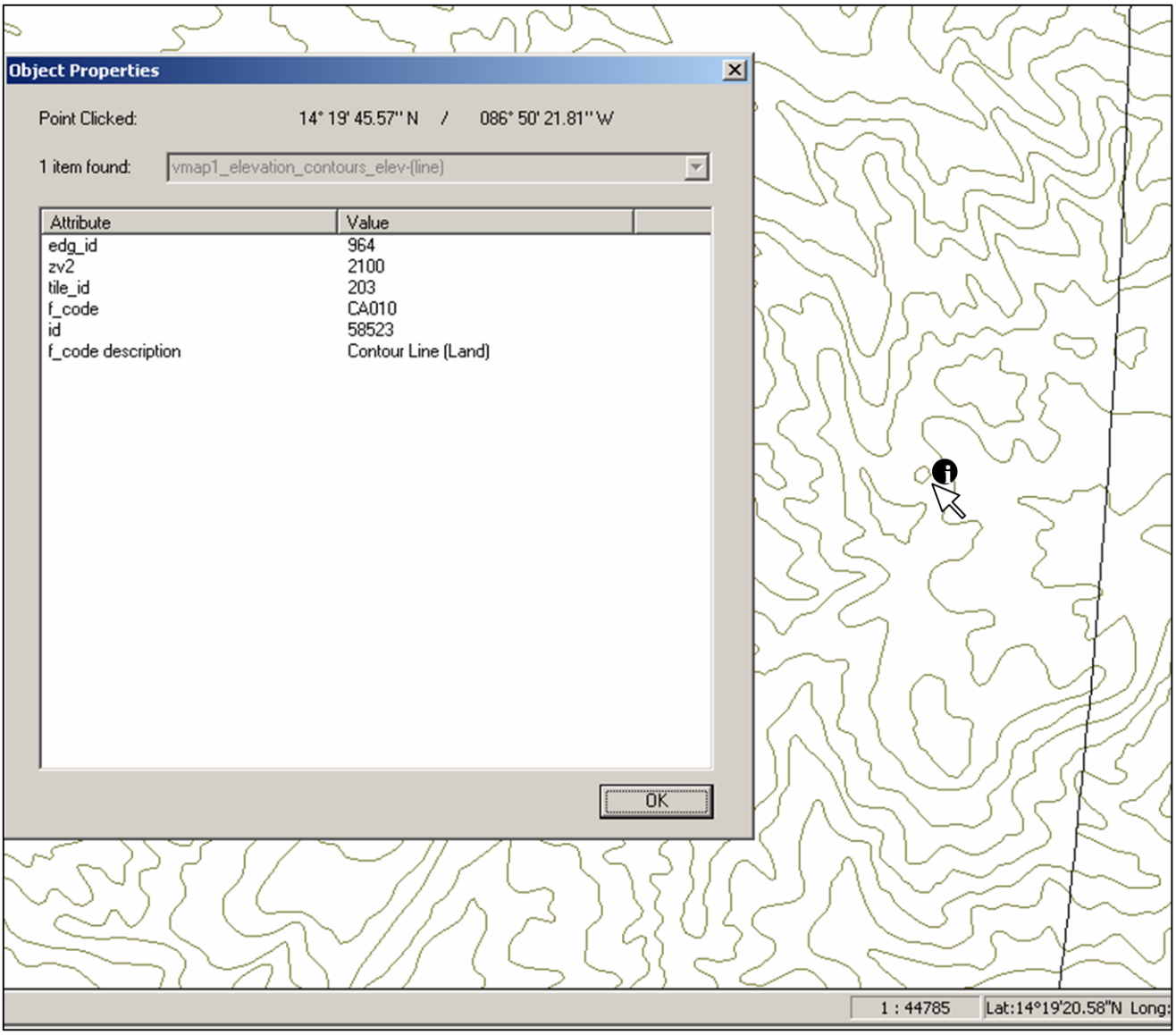


Figure 11.11. Determining the Contour elevation using VMAP.



11.5. DELETED.

11.6. Use of Hand-Held GPS Receivers for Development of Instrument Procedures. Hand-held GPS receivers shall not be used to determine geographic coordinates for instrument procedure development purposes for normal operations. During contingency operations at locations where no usable geodetic data is available, use of a hand-held GPS is permitted only after all other means of obtaining airport/NAVAID source data have been exhausted (DAFIF, Host Nation source, NGA photogrammetric analysis, on-site survey, etc.). Procedures developed using hand-held GPS coordinates are nonstandard. When coordinating the manual aeronautical data changes with the appropriate MAJCOM TERPS function, clearly iden-

tify all data (facility/aerodrome/runway/ obstruction locations, height, etc.) derived from hand-held GPS receivers.

11.7. DELETED.

11.8. DELETED.

11.9. DELETED.

11.10. DELETED.

11.11. DELETED.

11.12. DELETED.

Chapter 12

TERPS TRAINING

12.1. Training Responsibilities.

12.1.1. Units with a TERPS responsibility will ensure continuity of TERPS expertise. Primary and alternate (assistant) TERPS specialists shall be designated and attend required formal training. The alternate TERPS specialist should be as knowledgeable and involved in the unit's TERPS activities as the primary specialist.

12.1.2. The primary unit TERPS specialist will provide on the job qualification training for the alternate TERPS specialist(s). When a qualified TERPS specialist is not locally available to provide training, the MAJCOM shall assume or delegate to a TERPS qualified individual from another location, this training responsibility. A qualified TERPS specialist (other than the trainer) who is also a task certifier, must task certify the training.

NOTE: When the MAJCOM assumes or delegates training responsibility, the trainer shall be identified in writing. Maintain a copy of this letter/memo in the trainee's training record. Primary TERPS specialists will involve alternate TERPS specialists to the maximum extent possible in projects to ensure proficiency and project continuity.

12.2. Prescribed Training.

12.2.1. Formal training.

12.2.1.1. All primary and alternate TERPS specialists shall successfully complete required formal training prior to entering qualification training. Formal TERPS training includes course E3AZR1C171 000 and E3OZR13M4 000. Additionally, all primary and alternate TERPS specialist must attend formal USAF GPD training per AFFSA guidance.

12.2.1.2. HQ AFFSA/XOIP manages TERPS course E3AZR1C171 000 and E3OZR13M4 000 curriculum items. These items will constitute the CTS for this course.

12.2.1.3. MAJCOMs manage quotas for these courses according to Education and Training Course Announcements (ETCA).

12.2.2. Qualification Training. Prior to being assigned as a primary TERPS specialist, graduates of the formal TERPS school shall satisfactorily complete all items of the TERPS section in the AFJQS 1C1X1-002.

12.2.3. Specialized Training (GPS, AATCP-1(B), ICAO, Survey, FAA courses, etc.).

12.2.3.1. Specialized training, although not mandatory, is highly recommended.

12.2.3.2. HQ AFFSA/XOIP will identify and approve existing courses, or organize new courses through contractors to ensure such specialized training is made available to MAJCOMs and their units.

12.2.3.3. TERPS specialists with duties involving the design or evaluation of instrument procedures IAW NATO or ICAO standards shall have completed an AFFSA/XOIP approved ICAO PANS-OPS course. Successful completion constitutes qualification training for these standards.

12.2.4. Supplemental Training.

12.2.4.1. Supplemental Training is identified as any particular training received, or any other required training identified by HQ AFFSA/XOIP or MAJCOMs on new criteria, automation, ICs, changes to AFMAN 11-226, etc.

12.2.4.2. Supplemental training shall be documented on an AF IMT 1098 and maintained in the active duty and civilian member's training records.

12.2.5. Recurring/Review Training.

12.2.5.1. Recurring training is training provided to periodically review selected current operational procedures and techniques.

12.2.5.2. Recurring training shall be documented on an AF IMT 1098 and maintained in the active duty and civilian member's training records.

12.2.5.3. Review training is training conducted for the purpose of correcting specific operational deficiencies detected through performance evaluations, supervisory observations, observed trends, etc.

12.2.5.4. Review training shall be documented on an AF IMT 1098 and maintained in the active duty and civilian member's training records.

RONALD E. KEYS, Lt General, USAF

DCS/Air & Space Operations

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

NOTE: The following publications are required in the TERPS work area. In some cases, publications listed as "must be accessible within the Air Traffic Control Operation" may also be required in the TERPS work area. For example, if there were Special Use Airspace to consider when developing instrument procedures at your location, FAA Order 7400.8 would be required in the TERPS work area. At overseas locations, MAJCOMs may determine which FAA publications are required in the TERPS work area. When an electronic means (CD-ROM, via LAN, internet, etc.) is available to access these publications, maintaining paper copies in the TERPS work area is not required. Web sites listed below should have the associated publications available for review and/or download.

DoD

Chart Updating Manual (CHUM) and CHUM supplements (electronically derived ECHUM data acceptable)

Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design*

(**http://65.204.17.188/report/doc_ufc.html**)

National Imagery and Mapping Agency Catalog of Maps, Charts, and Related Products

NOTE: Electronic versions of the FLIP products listed below may be available at:

(**https://164.214.2.62/products/digitalaero/index.cfm**)

FLIP General Planning (GP) Guide

FLIP Area Planning (AP/1, 1A, 1B; AP/2, 2A; AP/3, 3A; AP/4, as applicable)

Complete set of FLIPs (as applicable)

NATO

NATO Supplement [AATCP-1(B)] to ICAO DOC 8168-OPS/611, Volume II, for the Preparation of Instrument Approach and Departure Procedures (Required at USAF TERPS functions in NATO locations only)

U.S. Air Force

NOTE: Electronic versions of the USAF items listed below may be available at:

(**http://www.e-publishing.af.mil/pubs/majcom.asp?org=AF**)

AFI 11-201, *Flight Information Publications*

AFMAN 11-225, *United States Standard Flight Inspection Manual (FAA Order 8200.1)*

AFMAN 11-226(I), *U.S. Standard for Terminal Instrument Procedures (TERPS) (FAA Order 8260.3)*

AFI 11-230, *Instrument Procedures*

AFMAN 13-215, *ATC Radar Maps and Associated Systems*

AFI 14-205, *Identifying Requirements for Obtaining and Using Geospatial Information and Services*

AFI 32-1042, *Standards for Marking Airfields*

AFI 32-1044, *Visual Air Navigation Systems*

AFI 32-7061, *The Environmental Impact Analysis Process*

AFI 32-7062, *Air Force Comprehensive Planning*

AFI 32-7063, *Air Installation Compatible Use Zone Program*

FAA Orders

NOTE: FAA items listed below with an '*' may be available at:

(**http://av-info.faa.gov/terps/directives%20page.htm**).

FAA Order 7100.9, *Standard Terminal Arrival Program and Procedures*

* FAA Order 7130.3, *Holding Pattern Criteria*

FAA Order 8240.32, *Request for Flight Inspection Service*

(**http://www.naco.faa.gov/index.asp?xml=fioo/faa8240orders**)

FAA Order 8240.36, *Instructions for Flight Inspection Reporting*

(**http://www.naco.faa.gov/index.asp?xml=fioo/faa8240orders**)

FAA Order 8240.47, *Determination of Instrument Landing System (ILS) Glidepath Angle, Reference Datum Heights (RDH), and Ground Point of Intercept (GPI)* (**http://www.naco.faa.gov/index.asp?xml=fioo/faa8240orders**)

* FAA Order 8260.19, *Flight Procedures and Airspace*

* FAA Order 8260.32, *U.S. Air Force Terminal Instrument Procedures Service*

* FAA Order 8260.38, *Civil Utilization of Global Positioning System (GPS)*

* FAA Order 8260.44, *Civil Utilization of Area Navigation (RNAV) Departure Procedures*

* FAA Order 8260.45, *Terminal Arrival Area (TAA) Design Criteria*

* FAA Order 8260.46, *Departure Procedure (DP) Program*

* FAA Order 8260.48, *Area Navigation (RNAV) Approach Construction Criteria*

* FAA Order 8260.50, *LPV Approach Procedure Construction Criteria*

* FAA Order 8260.51, *United States Standard for Required Navigation Performance (RNP) Instrument Approach Procedure Construction*

NOTE: The following publications must be ***accessible*** within the Air Traffic Control operation.

U.S. Air Force (see **http://www.e-publishing.af.mil/pubs/majcom.asp?org=AF** for the following USAF publications)

AFI 11-202V3, *General Flight Rules*

AFJMAN 11-208, *Department of Defense Notice to Airmen (NOTAM) System*

AFMAN 11-217, *Instrument Flight Procedures (Volumes 1 and 2)*

AFI 13-201, *Air Force Airspace Management*

AFI 13-203, *Air Traffic Control*

AFI 13-204, *Functional Management of Airfield Operations*

AFI 13-213, *Airfield Management*

AFMAN 32-1076, *Design Standards for Visual Air Navigation Facilities*

AFMAN 37-139, *Records Disposition Schedule*

AFI 33-360 Vol. 2, *Content Management Program-Information Management Tool (CMP-IMT)*

FAA Advisory Circulars and Orders

FAA AC 0031, *U.S. National Aviation Standard for the VOR/DME/TACAN Systems*

(**http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/Main-Frame?OpenFrameSet**)

FAA Order 7350.7, *Location Identifiers* (**http://www.faa.gov/atpubs/index.htm**)

FAA Order 7610.4, *Special Military Operations* (**http://www.faa.gov/atpubs/index.htm**)

FAA Order 7400.2, *Procedures for Handling Airspace Matters* (**http://www.faa.gov/atpubs/index.htm**)

FAA Order 7400.8, *Special Use Airspace*

FAA Order 7400.9, *Airspace Designations and Reporting Points*

FAA Order 7930.2, *Notice to Airman (NOTAM)* (**http://www.faa.gov/atpubs/index.htm**)

AIM, *Aeronautical Information Manual* (**http://www.faa.gov/ATPubs/AIM/index.htm**)

Title 14 – Code of Federal Regulations (see **http://www.gpoaccess.gov/ecfr/** for the following FARs)

FAR PART 71, *Designation of Federal Airways, Area Low Routes, Controlled Airspace, and Reporting Points*

FAR PART 73, *Special Use Airspace*

FAR PART 93, *Special Air Traffic Rules and Airport Traffic Patterns*

FAR PART 95, *IFR Altitudes*

FAR PART 97, *Standard Instrument Approach Procedures*

NOTE: The following publications should be available for reference at the indicated website.

FAA AC 70/7460-2, *Proposed Construction or Alteration of Objects That May Affect The Navigable Airspace*

(**http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/MainFrame?OpenFrameSet**)

FAA Order VN8200.3, *Policy With Respect To Military Program Procedures For Flight Inspection Of Foreign-Owned Air Navigation Facilities* (**http://avn.faa.gov/index.asp?xml=fioo/avnorders**)

FAA Order 6050.32, *Spectrum Management Regulations and Procedures Manual*

(**http://www.faa.gov/ats/aaf/asr/library/orders.htm**)

FAA Order 8260.23, *Calculation of Radio Altimeter Height* (**http://av-info.faa.gov/terps/directives%20page.htm**)

FAA Order 8260.31, *Foreign Terminal Instrument Procedures*

(**http://av-info.faa.gov/terps/directives%20page.htm**)

IFIM, *International Flight Information Manual* (**http://www.faa.gov/ats/aat/ifim/**)

NOTAMs, *Notices To Airman Domestic/International (Published monthly)* (**http://www.faa.gov/ntap/index.htm**)

FAA Order 8260.40, *Flight Management System (FMS) Instrument Procedures Development*

(**http://av-info.faa.gov/terps/directives%20page.htm**)

FAA Order 8260.42, *Helicopter Global Positioning System (GPS) Nonprecision Approach Criteria*

(**http://av-info.faa.gov/terps/directives%20page.htm**)

Abbreviations and Acronyms

AATCP Allied Air Traffic Control Publication

AC	Advisory Circular
AC	Airport Obstruction Chart
AFFSA	Air Force Flight Standards Agency
AFREP	Air Force Representative
AGL	Above Ground Level
AICUZ	Air Installation Compatible Use Zone
AIM	Aeronautical Information Manual
AIP	Aeronautical Information Publication
ALS	Approach Lighting System
ANG	Air National Guard
ARA	Airborne Radar Approach
ARP	Airport Reference Point
ASDA	Accelerate – Stop Distance Available
ASIS	Aviation Standards Information System
ASOS	Automatic Surface Observing System
ASR	Airport Surveillance Radar
ATC	Air Traffic Control
ATSEP	Air Traffic System Evaluation Program
AVN	Aviation System Standards (FAA)
BFSL	Best Fit Straight Line
CADRG	Compressed Arc Digitized Raster Graphics
CAT	Category
CATCA	Chief Air Traffic Control Automation
CFACC	Combined Force Air Component Commander
CG	Climb Gradient
CHUM	Chart Updating Manual
CIB	Controlled Image Base
CMDA	Circling Minimum Descent Altitude
CNF	Computer Navigation Fix
CONUS	Continental United States
CTA	Climb To Altitude (associated with ‘CG’)
DA	Decision Altitude

DAFIF	Digital Aeronautical Flight Information File
DER	Departure End of Runway
DH	Decision Height
DME	Distance Measuring Equipment
DoD	Department of Defense
DP	Departure Procedure
DR	Dead Reckoning
DTED	Digital Terrain Elevation Data
DVA	Diverse Vector Area
DVOF	Digital Vertical Obstruction File
ECHUM	Electronic Chart Updating Manual
ESV	Expanded Service Volume
FAA	Federal Aviation Administration
FAC	Final Approach Course
FAF	Final Approach Fix
FAR	Federal Air Regulations
FIO	Flight Inspection Office
FLIP	Flight Information Publication(s)
FOCA	Floor of Controlled Airspace
FMS	Flight Management System
FTF	Fix-To-Fix
FTIP	Foreign Terminal Instrument Procedure(s)
GCA	Ground Controlled Approach
GIS	Geographic Information Systems
GLS	Global Navigation Satellite System (GNSS) Landing System
GNSS	Global Navigation Satellite System
GPD	Global Procedure Designer
GPI	Ground Point of Intercept
GPS	Global Positioning System
GS	Glide Slope
HAA	Height Above Airport
HAT	Height Above Touchdown

IACC Inter-Agency Air Cartographic Committee

IAF Initial Approach Fix

IAP Instrument Approach Procedure

IAS Indicated Air Speed

ICAO International Civil Aviation Organization

IF Intermediate Fix

IFIO International Flight Inspection Office

IFR Instrument Flight Rules

ILS Instrument Landing System

IM Inner Marker

IMC Instrument Meteorological Conditions

IMT Information Management Tool

INS Inertial Navigation System

IPB Instrument Procedure Bulletin

JAA Joint Aeronautical Authority

JAR-OPS Joint Aviation Regulation – Operations (ICAO)

JFACC Joint Force Air Component Commander

KIAS Knots Indicated Airspeed

LAAS Low Altitude Alerting System/Local Area Augmentation System

LDA Localizer type Directional Aid/Landing Distance Available

LLZ Localizer (ICAO Standard)

LMM Compass locator at Middle Marker (ILS)

LNAV Lateral Navigation (without positive vertical guidance)

LOC Localizer (US Standard)

LOM Compass locator at Outer Marker ILS

LPV An approach procedure with vertical guidance based on WAAS electronic lateral and vertical guidance, which does not meet full precision approach standards

MAJCOM Major Command

MAP Missed Approach Point

MDA Minimum Descent Altitude

MEA Minimum Enroute Altitude

MIFRAC Minimum IFR Altitude Chart

MLS Microwave Landing System

MM Middle Marker

MMLS Mobile Microwave Landing System

MOC Master Obstacle Chart

MOCA Minimum Obstruction Clearance Altitude

MRA Minimum Reception Altitude

MSA Minimum Safe Altitude

MSAW Minimum Safe Altitude Warning

MSL Mean Sea Level

MV Magnetic Variation

MVAC Minimum Vectoring Altitude Chart

NACO National Aeronautical Charting Office

NAF Numbered Air Force

NATO North Atlantic Treaty Organization

NAVAID Navigational Aid

NAVFIG Naval Flight Information Group

NDB Non-Directional Radio Beacon

NFDC National Flight Data Center

NFPO National Flight Procedures Office (FAA AVN)

NGA National Geospatial-Intelligence Agency

NM Nautical Mile

NoPT No Procedure Turn Required (procedure turn shall not be executed without ATC clearance)

NOTAM Notice to Airmen

OCA/H Obstacle Clearance Altitude/Height

OCONUS Outside Continental United States

OE/AAA Obstruction Evaluation/Airport Airspace Analysis

OIS Obstacle Identification Surface

OROCA Off-Route Obstruction Clearance Altitude

ORTCA Off-Route Terrain Clearance Altitude

PANS-OPS Procedures for Air Navigation Services – Operations (ICAO)

PAR Precision Approach Radar

PCG Positive Course Guidance

PCN Planning Change Notice

PIDP Programmable Indicator Data Processor

PRM Precision Runway Monitor

PV Prevailing Visibility

QFE Altimeter Setting above station

QNE Altimeter Setting of 29.92 inches that provides height above a defined standard datum plane

QNH Altimeter Setting that provides height above mean sea level

RADAR Radio Detection and Ranging

RNAV Area Navigation

RNP Required Navigation Performance

ROC Required Obstacle Clearance

RPI Runway Point of Intercept

RVR Runway Visual Range

RWY Runway

SAR Special Administrative Region

SARPS Standards and Recommended Practices (ICAO)

SDF Simplified Directional Facility

SER Start End of Runway

SIAP Standard Instrument Approach Procedure

SID Standard Instrument Departure

SM Statute Mile

SRE Surveillance Radar Element of GCA (Instrument Approach Procedures Identification only - ICAO)

SSM Side-Step Maneuver

STAR Standard Terminal Arrival

STOL Short Take-off and Landing

SUA Special Use Airspace

TA Transition Altitude

TACAN Tactical Air Navigation equipment

TAS Terminal Amendment System

TAS True Airspeed

TCH Threshold Crossing Height

TCN Terminal Change Notice

TDZ	Touchdown Zone
TDZE	Touchdown Zone Elevation
TERPS	Terminal Instrument Procedures
THRE	Threshold elevation
TILS	TERPS Instruction Letters (FAA)
TLE	TERPS Liaison Element
TLS	Transponder Landing System
TLv	Transition Level
TODA	Take-off Distance Available
TORA	Take-off Run Available
TPC	Tactical Pilotage Chart
UCN	Urgent Change Notice
USAADE	United States Army Aeronautical Detachment Europe
USAASA	United States Army Aeronautical Services Agency
UVMAP	Urban Vector Map
VCOA	Visual Climb Over Airport
VDP	Visual Descent Point
VMAP	Vector Map
VMC	Visual Meteorological Conditions
VNAV	Vertical Navigation
VOR	Very High Frequency Omni-Directional Range Station
VORTAC	VOR and TACAN Navigation Facilities - collocated
V/V	Vertical Velocity
WAAS	Wide Area Augmentation System
WAC	World Aeronautical Chart
WGS	World Geodetic System
WIE	With Immediate Effect
WPT	Waypoint (RNAV)

Terms

NOTE: For additional terms, refer to the glossaries in AFMAN 11-226(I), FAA Order 7110.65, and *Flight Information Publication (FLIP)*, General Planning.

Air Force Flight Standards Agency (AFFSA)--USAF level agency responsible for the day-to-day management of the USAF Terminal Instrument Procedure Program.

Annual Audit--An audit conducted annually to identify each instrument procedure and validate the need for each, i.e., ensure each procedure is still meeting mission requirements. The annual audit also validates whether or not waivers to TERPS criteria are still required or have not expired; some may not be required any longer due to changes in criteria.

Final Approval Authority--Designated individual or agency that guarantees an instrument procedure meets all criteria as stipulated in AFMAN 11-226(I), NATO AATCP-1(B), this AFI, and other applicable directives. This authority also ensures the procedure package is complete as outlined in paragraph **5.3.4.** of this instruction.

Flight Inspection--An inspection conducted in accordance with AFJMAN 11-225**,** *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/or MAJCOM TERPS for tracking and updating instrument procedures; includes the Annual Audit.

FLIP Review--An in-depth check of the planview, profile, minima block, radar minimums, and airport sketch ensuring published information mirrors the procedure package. This review includes loose-leaf and locally published FLIPs and CE Comprehensive Planning Maps to verify changes.

Flyability Check--An airborne check normally accomplished by the flying unit requesting the procedure to determine if a procedure is operationally acceptable.

High Altitude Instrument Procedure--Terminal instrument procedure that usually begins (approach) or ends (departure) at or above 18,000 feet mean sea level (MSL). The beginning/ending altitude may be lower to achieve compatibility with airspace constraints and optimum traffic flows.

Low Altitude Instrument Procedure--Terminal instrument procedure that usually begins (approach) or ends (departure) below 18,000 feet MSL.

MAJCOM Review--An in-depth review of a new or revised instrument procedure performed by a MAJCOM TERPS authority or AFFSA/XOIP. 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 this review signifies completion of the MAJCOM Review by signing the appropriate record in a designated location.

Nonstandard Procedure--An instrument procedure that deviates from the criteria or requirements of this instruction, or AFMAN 11-226(I), or NATO AATCP-1(B), or any approved supplements to these documents.

Obstacle Shadowing--When the elevation of an obstacle, in an obstacle evaluation section, is equal to or greater than the section before (closer to ARP), the obstacle lower and further from the ARP is considered "shadowed."

Procedure Package--A collection of documentation that was 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 aeronautical information publications (AIP).

Public-Use Procedure--An instrument procedure that may be used by any agency or person.

Restricted-Use Procedure--An instrument procedure limited in use; 'USAF ONLY' or 'NOT FOR CIVIL USE'.

Segment Review--A process in which properly constructed TERPS areas and/or any other areas associated with the procedure are evaluated to ensure proper obstacle clearance.

Screen Height--Runway end crossing height.

Special Use Procedure--An operationally required instrument procedure that is not published in FLIP.

Standard Procedure--An instrument procedure that conforms to the criteria and requirements of this instruction, or AFMAN 11-226(I), or NATO AATCP-1(B), or any approved supplements to these documents.

Terminal Instrument Procedure--Any procedure designed for instrument approach or departure of aircraft to or from an airport or point in space (for example, non-precision and precision approaches and standard instrument departures).

Attachment 3

INSTRUMENT PROCEDURE CRITERIA

NOTE: This attachment clarifies and expands criteria that are not complete or are open to interpretation in AFMAN 11-226(I), *Terminal Instrument Procedures (TERPS)* and *NATO Allied Air Traffic Control Publication-1B* [AATCP-1(B)], *Criteria for the Preparation of Instrument Approach and Departure Procedures*. Use this attachment with AFMAN 11-226(I) and AATCP-1(B). When there is any conflict between this and the TERPS documents, the criteria here govern.

A3.1. AFMAN 11-226(I), Volume 1.

A3.1.1. Paragraph 5a(3); Circling (Added). Circling procedures shall not be designed for use with precision instrument approach procedures.

NOTE 1: This does not apply to host nation locations where the country has authorized circling from a precision procedure that does not have an accompanying non-precision procedure (i.e., ILS and Circling Minima without Localizer minima).

NOTE 2: Circling procedures are appropriate when localizer minima are authorized (see AFMAN 11-217, Chapter 15, *Circling Approaches,* for aircrew guidance).

A3.1.2. Paragraph 122a; Approval, Airport. This paragraph refers to FAA AC 150/5340-1, Marking of Paved Areas on Airports, and AC 150/5300-13, Airport Design. Use AFI 32-1042, *Standards for Marking Airfields*, and Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design* in lieu of these FAA Advisory Circulars. Additionally, AFI 32-1044, *Visual Air Navigation Systems*, and AFMAN 32-1076, *Design Standards For Visual Air Navigation Facilities*, contain guidance found in these FAA Advisory Circulars. Non-compliance with these Civil Engineering directives may require a waiver approval through appropriate CE channels and do not require a TERPS waiver.

A3.1.3. Paragraph 141; Nonstandard Procedures. Process waivers for military procedures according to this instruction.

A3.1.4. Paragraph 142; Changes. Process all non-procedural changes according to FLIP GP, Chapter 11; unit level TERPS functions shall provide a copy of the non-procedural change to their MAJCOM TERPS office. Process procedural changes through channels per paragraph **6.2.** in this AFI.

A3.1.5. Paragraph 150d; Coordination, Airspace Actions. Ensure all instrument procedures primary obstruction clearance areas are within controlled airspace in the United States and where required by host nation regulations. The following criteria apply:

A3.5.1.1. Altitudes or heights established must be at least 300 feet above the floor of Class E Airspace, except that these altitudes or heights may be rounded to the nearest 100 feet. Outside the United States, procedures must be contained within controlled airspace according to host nation criteria.

A3.5.1.2. Outside of Class D airspace (and extensions) and Class E airspace, use air traffic control IFR lateral separation standards. (See FAA Order 7110.65, Chapters 5 and 6)

A3.1.5.3. In Class D airspace (and extensions) and Class E airspace, use the criteria in FAA Order 7400.2 and FAA Order 8260.19, or the TERPS primary obstacle clearance area, whichever is greater.

NOTE: AFI 13-201, *Air Force Airspace Management*, contains procedures for processing airspace actions.

A3.1.6. Paragraph 161; Straight-In Procedure Identification. If DME and RADAR identify the FAF, add "RADAR OR DME REQUIRED" in the plan view of the procedure. This applies to any equipment required (ADF OR DME REQUIRED, ADF OR RADAR REQUIRED, etc.).

A3.1.7. Paragraph 163; Differentiation. At USAF locations where both high and low altitude instrument approach/departure procedure are published in the same DoD FLIP, a procedure can be identified as a HI/LO procedure, e.g., HI/LO TACAN or VOR/DME Rwy 36. The procedure will be crosshatched along the upper left half of the top border and along the lower right half of the bottom border. The procedure will contain Category A-E minimums.

A3.1.8. Paragraph 211; Positive Course Guidance (PCG). When Positive Course Guidance is available, it shall be used to develop Missed Approach segments. When ATC radar is available, radar may be used as positive course guidance and the following note shall be published on the Approach/Departure Procedure: "RADAR REQUIRED."

A3.1.9. Paragraph 215; Controlling Obstacle(s). Controlling obstacles have traditionally been the single highest obstacles in a segment or the one with the greatest amount of OCS penetration. However, advances in USAF TERPS automation, including the use of DTED Level 1/2/SRTM and DVOF, will virtually assure that there will be multiple obstructions with the same altitude or an equal amount of OCS penetration identified during instrument procedure segment construction. Apply the guidance in this paragraph to determine which obstacle will be identified as the controlling obstacle.

NOTE: "Obstacle" in this context includes both terrain and man-made features. Adjustment for vertical and horizontal accuracies will be added to man-made structures prior to identifying the controlling obstacle. The value of the reported/user declared vertical accuracy will be added to the MSL elevation of the obstacle. For horizontal adjustments, the greater of either the reported/user declared horizontal accuracy or the accuracy of the geodetic coordinates will be considered, in effect creating an three-dimensional cylinder of a specified height and radius.

A3.1.9.1. Equivalent/Effective Height. Obstacles in the secondary area may be higher than obstacles in the primary area and result in the same segment minimum altitude, therefore it's height is effectively reduced by the amount of secondary surface rise. This is the obstacles 'equivalent height'. When specified, an object's height is effectively increased by the amount of it's vertical accuracy. This is the obstacles effective height. Obstacles with vertical accuracy specified in the secondary have an effective height equal to it's MSL + vertical accuracy – secondary rise.

NOTE: Even though the precision final segment X area is technically considered primary area, an effective height is determined for both the X and Y surfaces. The effective height is determined by the obstacle's MSL elevation, minus the amount of X and/or Y surface rise (combined, if applicable) from the edge of the W surface.

A3.1.9.2. Segment/Subsegment. For the purposes of this paragraph, a procedure segment/subsegment generally starts at the fix/point encountered first as the procedure is flown and ends at the fix/point marking the beginning of the next segment.

Example 1: A non-precision 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/point.

A3.1.9.3. Feeder Route/Initial Approach/Intermediate Segment/Non-Precision Final Segments. Select the Controlling Obstacle in the following order:

A3.1.9.3.1. Segments/subsegments other than Procedure Turn and Hold in Lieu of Procedure Turn;

A3.1.9.3.1.1. Select the obstacle with the highest height/effective height.

A3.1.9.3.1.2. When multiple obstacles have the same height, select the obstacle closest to the end of segment line along the flight track (measured parallel to the runway centerline).

A3.1.9.3.1.3. When multiple obstacles are the same distance from the end of a segment, select the obstacle closest to the runway centerline (measured perpendicular to the centerline).

A3.1.9.3.2. Procedure Turn segments/subsegments;

A3.1.9.3.2.1. Select the obstacle with the highest height/effective height.

A3.1.9.3.2.2. When multiple obstacles have the same height, select the obstacle closest to the Procedure Turn Fix.

A3.1.9.3.2.3. When multiple obstacles are the same distance from the Procedure Turn Fix, select the obstacle closest to the inbound course line.

A3.1.9.3.3. Hold in Lieu Of A Procedure Turn segments/subsegments;

A3.1.9.3.3.1. Select the obstacle with the highest height/effective height.

A3.1.9.3.3.2. When multiple obstacles have the same height, select the obstacle closest to the Holding Fix.

A3.1.9.3.3.3. When multiple obstacles are the same distance from the holding fix, select the obstacle closest to the inbound course line.

A3.1.9.4. Precision Final Segment. Select up to three controlling obstacles, as applicable.

A3.1.9.4.1. Controlling Obstacle 1. When multiple obstacles penetrate a W, X, or Y OCS, identify the obstacle that requires the highest Decision Altitude in the following order;

A3.1.9.4.1.1. Select the penetrating obstacle with highest height/effective height above Approach Surface Base Line (ASBL).

A3.1.9.4.1.2. When multiple obstacles have the same height/effective height above ASBL, select the obstacle closest to the runway threshold (measured parallel to the runway centerline).

A3.1.9.4.1.3. When multiple obstacles are the same distance from the runway threshold, select the obstacle closest to the runway centerline (measured perpendicular to the centerline).

A3.1.9.4.2. Controlling Obstacle 2. Always identify the obstacle requiring the highest Glide Path Angle (GPA) in the following order:

A3.1.9.4.2.1. The obstacle requiring the greatest GPA, applying the formula

$$102 \div \frac{1}{\left[\frac{E}{(D-(200+d)}\right]} = \text{GPA}$$

Where: E = Obstacle Effective Height Above ASBL

D = Obstacle Distance from threshold

d = 954 – GPI (Vol. 3 para 3.2.1)

A3.1.9.4.2.2. When multiple obstacles produce the same GPA, select the obstacle closest to the runway threshold (measured parallel to the runway centerline).

A3.1.9.4.2.3. When multiple obstacles are the same distance from the runway threshold, select the obstacle closest to the runway centerline (measured perpendicular to the centerline).

A3.1.9.4.3. Controlling Obstacle 3. When multiple obstacles penetrate a W, X, or Y OCS, identify the obstacle that requires the greatest amount of threshold displacement in the following order;

A3.1.9.4.3.1. Identify the obstacle with the greatest amount of OCS penetration.

A3.1.9.4.3.2. When multiple obstacles have the same amount of OCS penetration, select the obstacle closest to the runway threshold (measured parallel to the runway centerline).

A3.1.9.4.3.3. When multiple obstacles are the same distance from the runway threshold, select the obstacle closest to the runway centerline (measured perpendicular to the centerline).

A3.1.9.5. Non-precision 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.

A3.1.9.5.1. Missed approach OCS evaluation (including ‘Climb-In-Hold’ obstacles).

A3.1.9.5.1.1. When multiple obstacles penetrate the OCS, identify the controlling obstacle in the following order;

A3.1.9.5.1.1.1. Select the obstacle that requires the highest climb gradient to remove the penetration.

A3.1.9.5.1.1.2. When multiple obstacles require the same climb gradient, select the obstacle that causes the highest ‘Climb-To’ altitude.

A3.1.9.5.1.1.3. When multiple obstacles have the same ‘Climb-To’ altitude, select the obstacle closest to the runway centerline.

A3.1.9.5.1.2. When no penetrating obstacles exist, identify the controlling obstacle in the following order;

A3.1.9.5.1.2.1. Select the obstacle with the elevation that comes closest to penetrating the OCS.

A3.1.9.5.1.2.2. When multiple obstacles are equally close to penetrating the OCS, select the obstacle that is farthest away from the missed approach point (MAP), using the appropriate method for measuring this distance.

NOTE: The obstacle farthest from the MAP is selected since this can be equated to the obstacle that would require the highest 'climb-to' altitude when a penetration exists.

A3.1.9.5.1.2.3. When multiple obstacles are the same distance from the MAP, select the obstacle closest to the runway centerline.

A3.1.9.5.2. Minimum missed approach obstruction altitude; select the controlling obstacle in the following order;

A3.1.9.5.2.1. Identify the obstacle within the missed approach area with the highest height/effective height.

A3.1.9.5.2.2. When there are multiple obstacles with the same height/effective height, select the obstacle closest to the MAP using the appropriate method for measuring distance.

A3.1.9.5.2.3. When there are multiple obstacles the same distance from the MAP select the obstacle closest to the runway centerline.

A3.1.9.5.3. Minimum missed approach holding; select the controlling obstacle in the following order;

A3.1.9.5.3.1. Select the obstacle with the highest height/effective height.

A3.1.9.5.3.2. When there are multiple obstacles with the same height/effective height select the obstacle closest to the holding fix.

A3.1.9.5.3.3. When there are multiple obstacles the same distance from the holding fix select the obstacle closest to the inbound course line.

A3.1.9.6. Precision Missed Approach. Controlling obstacles are identified separately for Section 1, Section 2, minimum missed approach obstruction altitude and minimum holding altitude.

A3.1.9.6.1. Section 1. Select the controlling obstacle in the following order;

A3.1.9.6.1.1. When penetrating obstacles exist, select the obstacle that requires the highest Decision Altitude.

A3.1.9.6.1.2. When no penetrating obstacles exist, select the obstacle with the elevation that comes closest to penetrating the OCS.

A3.1.9.6.1.3. When multiple obstacles are equally close to penetrating the OCS, select the obstacle closest to the Decision Altitude point (measured parallel to the runway centerline).

A3.1.9.6.1.4. When multiple obstacles are the same distance from the Decision Altitude point, select the obstacle closest to the runway centerline (measured perpendicular to the centerline).

A3.1.9.6.2. Section 2 (including 'climb-in-hold' obstacles). Select the controlling obstacle in the following order;

A3.1.9.6.2.1. When penetrating obstacles exist:

A3.1.9.6.2.1.1. Select the obstacle that requires the highest climb gradient to remove the penetration.

A3.1.9.6.2.1.2. When multiple obstacles require the same climb gradient, select the obstacle with the highest "climb-to" altitude.

A3.1.9.6.2.1.3. When multiple obstacles have the same "climb-to" altitude, select the obstacle closest to the runway centerline.

A3.1.9.6.2.2. When no penetrating obstacles exist:

A3.1.9.6.2.2.1. Select the obstacle with the elevation that comes closest to penetrating the OCS.

A3.1.9.6.2.2.2. When multiple obstacles are equally close to penetrating the OCS, select the obstacle that is farthest away from the Section 1 termination point using the appropriate method for measuring that distance.

A3.1.9.6.2.2.3. When multiple obstacles are the same distance from the Section 1 termination point, select the obstacle closest to the runway centerline.

A3.1.9.6.3. Minimum missed approach obstruction altitude; select the controlling obstacle in the following order;

A3.1.9.6.3.1. Select the obstacle within the Missed Approach area with the highest height/effective height.

A3.1.9.6.3.2. When there are multiple obstacles with the same height/effective height;

A3.1.9.6.3.2.1. Section 1. Select the obstacle closest to the Decision Altitude point.

A3.1.9.6.3.2.2. Section 2. Select the obstacle closest to the Section 1 termination point using the appropriate method for measuring this distance.

A3.1.9.6.3.3.3. When there are multiple obstacles meeting the above criteria, select the obstacle closest to the runway centerline.

A3.1.9.6.4. Minimum Holding Altitude. Select the controlling obstacle using the same method as for non-precision missed approach in paragraph **A3.1.9.5.**.

A3.1.9.7. Departures. Select the obstacle that requires the highest climb gradient and is closest to the departure end of the runway.

A3.1.9.8. ESA/MSA or ATC Charts sectors/TAA right/left base, straight in areas.

A3.1.9.8.1. Select the obstacle either in the sector/area or buffer (if applicable) which results in the greatest minimum sector/area altitude.

A3.1.9.8.2. When there are multiple obstacles that result in the same minimum sector/area altitude, the controlling obstacle is the one inside the sector/area boundary (as opposed to the buffer area) and closest to the origin (center of chart, or appropriate waypoint).

A3.1.9.8.3. When there are multiple obstacles resulting in the same minimum sector altitude but all are in the sector/area buffer, the controlling obstacle is the one closest to the sector/area edge.

A3.1.10. Paragraph 220; Feeder Routes. Do not construct feeder routes containing a turn point defined by a fix between the feeder facility and the IAF.

A3.1.11. Paragraph 221; Minimum Safe/Sector Altitudes (MSA). Comply with this paragraph 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. This will only be accomplished after the procedure specialist has coordinated with all concerned agencies.

A3.1.12. Paragraph 230, Initial Approach Segment. The Initial Approach segment may be made up of a single segment or a series of subsegments. Each subsegment can be a straight course or radial, an arc, a procedure turn, a teardrop turn, penetration turn, a course reversal based on non-collocated facilities, a hold in lieu of a procedure turn or a dead reckoning subsegment.

A3.1.12.1. The length of the subsegment that follows the IAF shall be at least twice the fix error that follows the fix (see AFMAN 11-226(I), Vol. 1, Paragraph 287a and Figure 29).

A3.1.12.2. Stepdown fixes may or may not correspond to the fixes that define the subsegments of the Initial Approach Segment. If stepdown fixes are specified, AFMAN 11-226(I), Vol. 1, Paragraph 288c shall apply.

A3.1.12.3. When stepdown fixes are specified, the controlling obstacle and minimum altitude for the portion prior to and after the stepdown fix shall be identified.

A3.1.12.4. The total length of all subsegments combined may not exceed 50 NM unless an operational requirement exists.

A3.1.12.5. When the turn between initial subsegments exceeds 90 degrees, a radial or bearing which provides at least 2 NM lead shall be identified.

A3.1.12.6. When altitudes are specified at the fixes marking both the beginning and end of a segment/subsegment (to include stepdown fixes), initial descent gradient criteria shall be applied in that segment/subsegment.

A3.1.12.7. Straight and Arc Courses. The turn between a straight or arc subsegment and the following subsegment shall not exceed 120 degrees. Turns greater than 120 degrees require a course reversal subsegment.

A3.1.12.8. Course Reversals. Straight or arc subsegment(s) may precede a course reversal subsegment (procedure turn, high altitude teardrop penetration turn, course reversal based on non-collocated facilities or holding in lieu of procedure turn). However, the course reversal subsegment must be the last subsegment encountered prior to reaching the intermediate of final approach segment.

NOTE: This restriction does not apply when AFMAN 11-226(I), Vol. 1, paragraph 244e(1) is applied.

A3.1.12.8.1. Procedure Turn. When a subsegment precedes the procedure turn, use the Initial Approach Fix (IAF) crossing altitude when applying AFMAN 11-226(I), Vol. 1, para 234b and Table 1 to determine the PT primary area dimensions.

A3.1.12.8.2. High Altitude Teardrop Penetration Turn. When determining the penetration turn distance/divergence from AFMAN 11-226(I), Vol. 1, Paragraph 235b, and Table 2, do not consider the altitude loss in the subsegment prior to the penetration turn fix/facility. Delay before descent shall only be applied from the penetration turn fix/facility.

A3.1.12.8.3. Hold-in-lieu-of Procedure Turn. The minimum holding subsegment altitude shall be no lower than the IAF crossing altitude of the preceding subsegment (when specified).

A3.1.12.9. Dead Reckoning. A dead reckoning subsegment must be the last subsegment encountered prior to reaching the intermediate or final approach segment.

A3.1.13. Paragraph 231; Altitude Selection. The altitude selected shall not be below the teardrop completion altitude where a teardrop is required.

A3.1.14. Paragraph 232a[1]; Initial Approach Segments Based on Straight Course and Arcs With Positive Course Guidance, Alignment, Courses. Also apply this paragraph when both segments are initial segments.

A3.1.15. Paragraph 232a[2]; Initial Approach Segments Based on Straight Course and Arcs With Positive Course Guidance, Arcs, Table 1. When a 15 NM arc is used, the OPTIMUM descent gradient is 800 feet per nautical mile.

A3.1.16. Paragraph 232b. Apply this paragraph to include the following: 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.

A3.1.17. Paragraph 234d, Initial Approach Segment Based on PT. Apply this paragraph with the following addition: The altitude required for increasing the limits and maneuvering zone shall be rounded up to the next mile; i.e., if the required altitude is 310’, then it shall be rounded up to 400 feet, thus requiring 2 miles additional distance for the limit and maneuvering zone.

A3.1.18. 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, procedure turn or other initial segment criteria shall be used.

NOTE: 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.

A3.1.19. Paragraph 235b; Initial Approach Based on High Altitude Teardrop Penetration. Apply this paragraph, with the statement "altitude to be lost in the procedure" referencing the portion of the approach procedure from the IAF to the IF vs. the entire length of the procedure from IAF to MAP.

A3.1.20. Paragraph 243. Application of this paragraph is not authorized.

A3.1.21. Paragraph 252; Descent Angle/Gradient. Construct nonprecision approaches to provide a descent angle that is coincident with the associated VGSI angle. If this is not possible, publish the following note in the profile view of the procedure: ‘VGSI and descent angles not coincident.’

A3.1.21.1. Do not publish a descent angle/gradient for ASR approaches.

A3.1.21.2. The Vertical Path Angle (VPA) and TCH shall not be published for the LOC portion of a precision approach. The angle and TCH for the ILS glideslope portion will be published as it always has.

A3.1.22. Paragraph 253; Visual Descent Point (VDP). With the exception of ASR approaches, establish a VDP for all straight in non-precision procedures.

NOTE: Procedures outside CONUS (i.e., Host Nation procedures and military bases applying AATCP-1(B) criteria), exceptions may apply.

A3.1.22.1. A VDP fix can be less than one mile from a step-down fix or missed approach point, provided chart clarity is not compromised.

A3.1.22.2. When a VDP cannot be published, document the reason in the user entered notes/ procedure package.

A3.1.23. Paragraph 261; Circling Approach Area Not Considered for Obstacle Clearance. When a sector is eliminated from the obstacle clearance area (e.g., "Circling NA West of Rwy 18-26"), expand the obstacle clearance area to include a portion of the sector eliminated. The expanded portion of the obstacle clearance area will begin 500 feet down the runway (from the threshold) on the centerline. It will splay ± 10° either side of runway centerline and extend outward to the maximum circling distance. See **Figure A3.1.**

A3.1.24. Paragraph 270; Missed Approach Segment. When developing missed approaches for PAR or ASR procedures, it is not necessary to use "non-radar" NAVAIDs. These radar missed approaches should be the same as normal climbout instructions, if possible, to get the aircraft back to minimum vectoring altitude for another approach or headed to an alternate airfield.

A3.1.25. Paragraph 272; MAP. A crossing radial may be used to define a missed approach point. When using this option, the procedure will be considered nonstandard and requires waiver processing IAW paragraph **5.5.**. Maximum acceptable fix error is 1/2 mile for a crossing radial.

NOTE: When considering missed approach point locations using a DME fix or a crossing radial, the MAP shall be identified at or prior to the first usable landing surface. The MAP may be identified as the on-airport NAVAID only when no usable/satisfactory DME fix or crossing radial is available.

A3.1.26. Paragraph 274; Straight Missed Approach Obstacle Clearance. In addition, note that instances may occur when an obstacle penetrates the 40:1 precision or non-precision missed approach surface and other solutions (e.g., DA adjustments) are not feasible. An equivalent level of safety may be achieved by selecting a climb gradient that matches a missed approach surface that clears the obstacle. When using this option, the procedure will be considered nonstandard and requires waiver processing IAW paragraph **5.5.**. Required minimum climb rate information must be graphically displayed on the procedure. The altitude or fix to which the climb gradient must be maintained must be published.

NOTE: A climb gradient required for Air Traffic Control purposes or to prevent a climb-in-holding situation at the end of the missed approach segment shall be considered nonstandard and processed IAW paragraph **5.5.**. (Also see AFMAN 11-226(I), Volume 1, paragraph 141).

A3.1.27. Paragraph 276b; Turning Missed Approach Obstacle Clearance; More Than 90° Turn. Zone 3 only extends to the edge of the secondary area, and then extends perpendicular to the missed approach course into the secondary.

A3.1.28. Paragraph 282; Course/Distance Fixes. In addition, describe in nautical miles when a "fly-off" (level flight) is maintained from the primary facility or fix, before the beginning of the penetration/procedure turn or descent. Depict the beginning of the penetration/procedure turn or descent on the planview and profile by DME values when available.

A3.1.29. Paragraph 288c3. Comply with paragraph to include, altitude shall be rounded to the nearest 20 or 100 foot increment.

A3.1.30. Paragraph 289b. Apply this paragraph to include the following: Measure the distance of the obstacle in the secondary area perpendicular to the final approach course.

A3.1.31. Paragraph 310; Do not establish or publish alternate minima for Air Force procedures.

NOTE: Alternate minima are given in AFI 11-202, Volume 3, *General Flight Rules*, or as supplemented by each MAJCOM.

A3.1.32. Paragraph 323c; Minimums Adjustments, Excessive Length of Final Approach. When required, excessive length of final adjustments shall be applied to all approaches, including those not meeting straight-in alignment criteria. Do not adjust the ROC of the circling approach maneuvering area as defined in Chapter 2, Section 6, for excessive length of final.

A3.1.32.1. Determine the length of the straight-in/circling final approach segment by measuring the distance from the plotted position of the FAF to the FEP (see AFMAN 11-226(I), paragraph 252 for FEP definition).

A3.1.32.2. Use the ROC calculated by the criteria in paragraph **A3.1.22.** to determine the CMDA. The published CMDA shall be the higher of:

A3.1.32.2.1. The elevation specified by this paragraph.

A3.1.32.2.2. The elevation determined by application of AFMAN 11-226(I), paragraph 260.

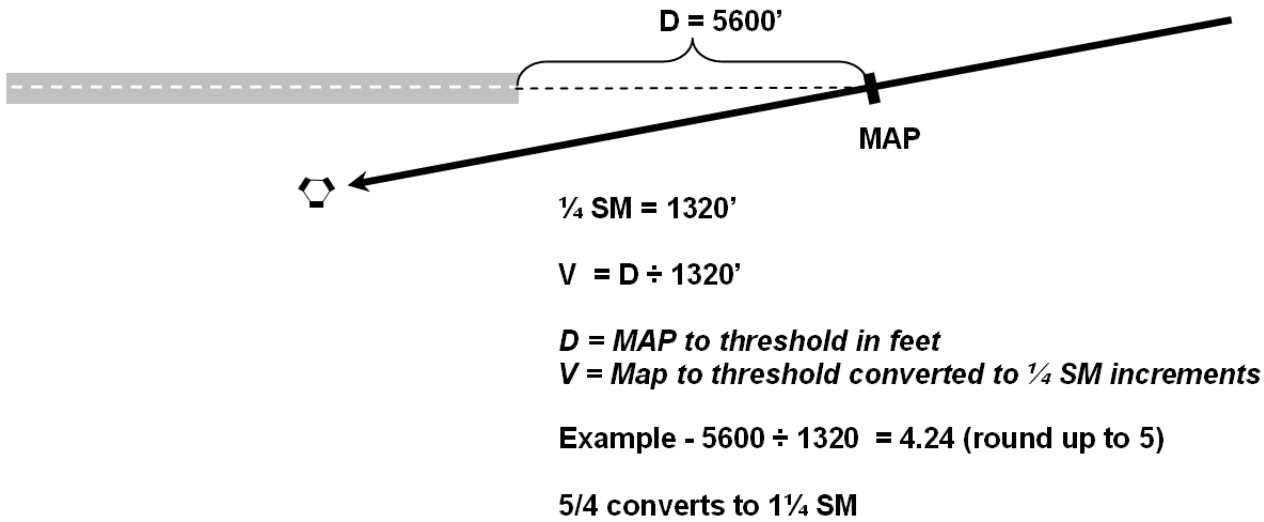
A3.1.32.2.3. The elevation derived from AFMAN 11-226(I), paragraph 351, Table 11.

A3.1.33. Paragraph 325; Decision Height (DH). In addition to the requirements of **Chapter 3**, make sure each procedure specifies the HAT and/or height above airport (HAA). For foreign procedures, the minima must be the higher of the minima established by the host nation or required by AFMAN 11-226(I) or AATCP-1(B).

A3.1.34. Paragraph 330; Establishment of Visibility Minimums.

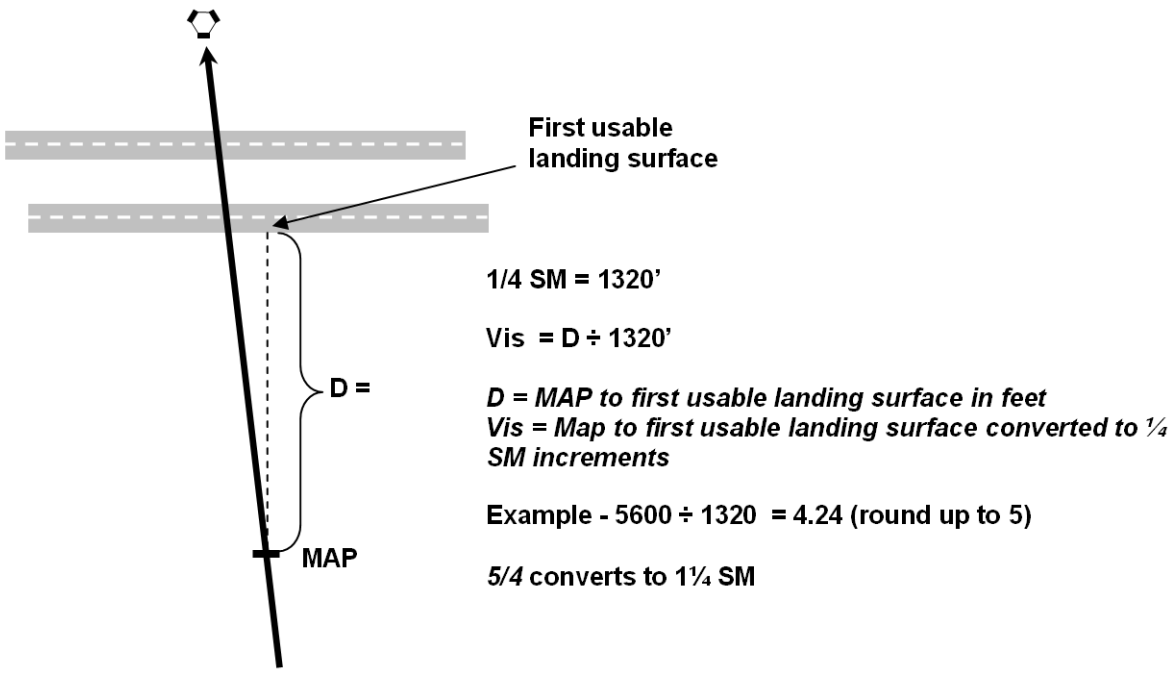
A3.1.34.1. Paragraph 330c(1), determining the effect of MAP-to-threshold distance on straight-in procedures (Figure A3.1.2). Convert the MAP-to-threshold distance (measured in feet) to the higher 1/4 ***STATUTE MILE*** increment when determining the minimum visibility, prior to applying approach light credit. Use the greater of this distance or the values from Table 6A.

Figure A3.1. Determining MAP-to-Threshold Distance (Straight-in).



A3.1.34.2. Paragraph 330c(1), determining the effect of MAP-to-threshold distance on circling-only procedures (**Figure A3.2.**). Convert the distance from the MAP to the first usable landing surface (measured in feet) to the higher 1/4 ***STATUTE MILE*** increment when determining the minimum visibility, prior to applying approach light credit. Use the greater of this distance or the values from Table 6A.

Figure A3.2. Determining MAP-to-Threshold Distances (Circling).



A3.1.34.3. Paragraph 330c(2). The annotation "Fly Visual to Airport" shall be placed in the profile view when the MAP is 2 SM or greater from the threshold for straight-in procedures or when the MAP is 2 SM or greater from the closest landing surface for circling-only approaches.

A3.1.35. Paragraph 331; Effect of HAT/HAA and Facility Distance on Straight-in and Circling Visibility Minimums.

A3.1.35.1. When determining the effect of facility distance to MAP or threshold on straight-in procedures, measure the distance in ***NAUTICAL MILES*** from the facility providing final approach course guidance direct to the MAP or to the FEP. Use the greater of these distances when applying Table 6A.

A3.1.35.2. When determining the effect of facility distance to MAP or threshold (whichever is farther) on circling-only procedures, measure the distance in ***NAUTICAL MILES*** from the facility providing final

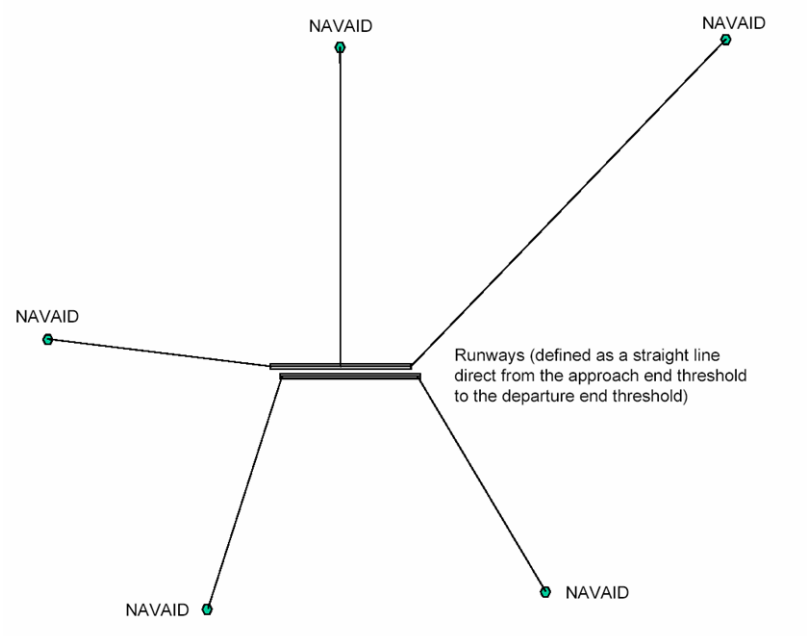
approach course guidance direct to the MAP or direct to the closest runway (**Figure A3.3.**). Use the greater of these distances when applying Table 6A.

A3.1.36. Paragraph 334c; Runway Requirements for Approval of RVR. Use RVR minima equivalent to the no-light minima when runway markings are removed, deteriorated, or obscured and touchdown zone, and centerline lights are inoperative. See paragraph **A3.1.38.**.

A3.1.37. Paragraph 341; Standard Lighting Systems. For SALS or SALSF systems, use SSALS Table 8 entries.

NOTE: SALSF systems are non-standard for the USAF, therefore the sequenced flashers are not considered usable.

Figure A3.3. Determining the Effect of Facility Distance on Visibility Minimums (Circling).



A3.1.38. Paragraph 342a; Operational Conditions, Markings. Runway markings should be in good condition when the procedures are established and minimums are prescribed IAW AFMAN 11-226(I), Volume 1, Chapter 3 criteria. However, the condition of the runway markings will vary during periods when they are partially obscured by surface water, snow, ice or tire marks and it may be difficult to assess their value under these conditions. Airfield Management will coordinate with the OG/CC, or formally designated representative, as outlined in MAJCOM Supplement to AFI 11-230, to determine when these conditions are no longer adequate for taking credit for lights and will provide the results to the TERPS Specialist.

A3.1.39. Paragraph 343e; Visibility Reduction. Do not use see and avoid procedures for obstacles when developing Air Force instrument procedures.

A3.1.40. Paragraph 350; Standard Straight-in Minimums. Table 10. Unless one of the footnotes is applicable, a standard length approach light system is required to utilize the visibility/RVR listed for a specific HAT and aircraft category. Standard approach light lengths are detailed in AFMAN 11-226(I), Volume 1, Appendix 5. When the system is non-standard (to include length and/or configuration), and local authorities (NGA for FTIP locations) have not identified an equivalent system, apply the "NO LIGHTS" visibility from the table when a footnote is not specified.

A3.1.41. Paragraphs 413a(2), 513a(2)(b), 613a(2), and 713a(2)(b). Circling approach alignment criteria, using on-airport facilities, permits the use of all radials (360 degrees). It is not a requirement for the final approach course to pass through a portion of the landing surface. This criterion is applicable to On-Airport VOR (NO FAF); TACAN; VOR/DME; VOR with FAF; NDB ON-AIRPORT (NO FAF); and NDB with FAF circling procedures.

A3.1.42. Paragraph 523b; Final Approach Segment, Arc Final Approach. Application of this paragraph is not authorized.

A3.1.43. Paragraph 613c(1) and 713c(1); Final Approach Segment, Obstacle Clearance, Straight-in. NDB procedures that use the reduced ROC (military exception) shall have following note published in the planview: "NOT FOR CIVIL USE". NDB procedures developed using the higher (civil) ROC do not require this caveat unless driven by a different requirement.

A3.1.44. Appendix 5, paragraph 1; Approach Lighting Systems. The sequenced flashers are not a part of the approach lighting system when applying credit for lights to instrument procedures. If the sequenced flashers are inoperative, the visibility minima for a procedure are not affected. However, if the Runway Alignment Indicator Lights (RAIL) are part of the approach lighting system (MALSR and SSALR), and the RAIL portion of the system becomes inoperative, revert to no-light visibility minimum.

A3.2. AFMAN 11-226(I), Volume 3.

A3.2.1. Paragraphs 1.2.14, 1.2.15, 2.11, Obstacle Free Zones (OFZ). FAA Advisory Circular AC 150 5300-13 is not applicable to military airports; therefore USAF locations do not have runway, inner approach, or inner transitional OFZs. Do not restrict approach minimums based on any OFZ penetration.

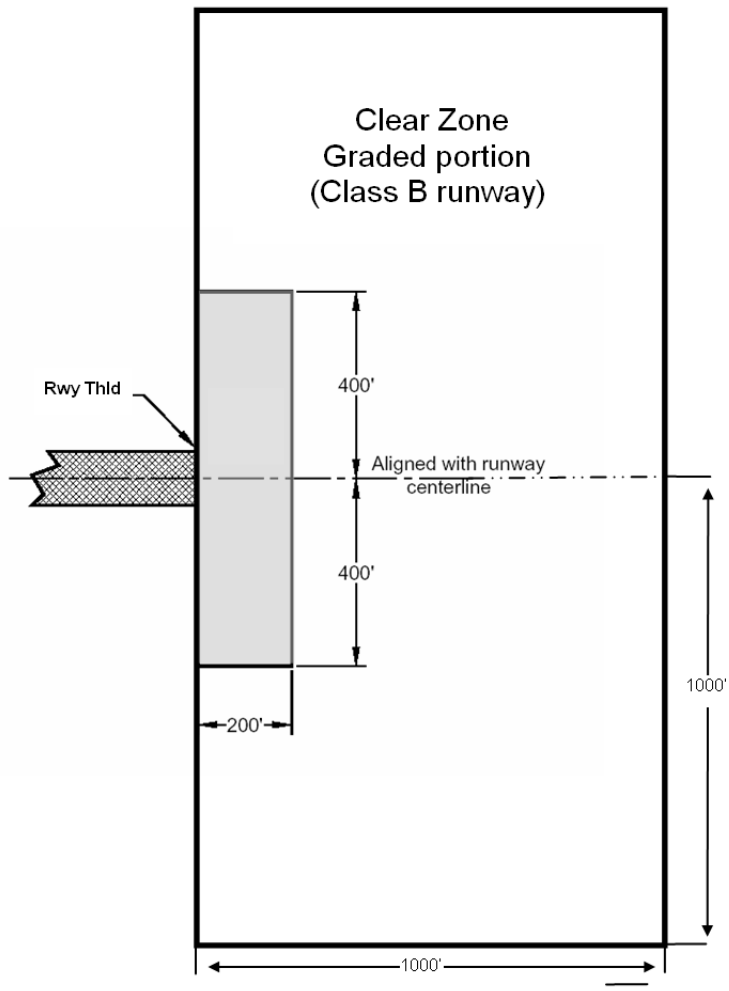
A3.2.2. Paragraph 2.3; En Route, Initial, and Intermediate Segments. Solid-state ILS localizers have false courses approximately 35 degrees either side of the final approach course. To assist pilots in avoiding these courses, establish a lead point (fix, lead radial, or bearing) that provides at least 2 miles of lead when any part of the initial approach course lies outside of plus or minus 10 degrees of the final approach course.

A3.2.3. Paragraph 2.6.1; Category I Threshold Crossing Height (TCH) Requirements and Table 2-3. When the TCH is commissioned or determined by BFSL at a height which results in a WCH of less than 20 feet or greater than 50 feet for the types of aircraft expected to use the runway, publish an Advisory Note in the IFR Supplement that details the deviations to the Height Group wheel crossing height restrictions and process the procedure as a standard procedure (see **Figure 5.1.**, Processing Standard Instrument Procedures). Sample note: "CAUTION: Height Group 4 WCH 15 ft."

A3.2.4. Paragraph 2.9.1; Distance Measuring Equipment (DME). A DME fix used in lieu of an Outer Marker may be exempted from the six-degree angular divergence criteria only upon completion of a successful flight inspection to verify the suitability of the fix. This exemption is limited to 23 degrees (AFMAN 11-226(I), Volume 1, paragraph 282).

A3.2.5. Paragraphs 3.3 and 4.2, Precision Object Free Areas (POFA). Even though the 'POFA' is not applicable to military airfields, the area associated with a POFA (800' wide centered on runway centerline, extending 200' past threshold) must be evaluated for TERPS purposes. The shaded area (see **Figure A3.5.**) is encompassed by the graded portion of the clear zone (defined in Unified Facilities Criteria (UFC) 3-260-01, Airfield and Heliport Planning and Design). For unrestricted instrument procedures, no above ground objects, regardless of frangibility, are permitted in the shaded area except for taxiing/holding aircraft and those required for air navigation or aircraft ground maneuvering purposes. Parked aircraft (i.e., parking ramps, arm/de-arm areas, hot brake areas, etc.) and/or those deviations permitted by UFC-3-260-01, Attachment 14, that cannot be classified as "necessary for air navigation/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 above ground obstacles/objects, the minimum HAT/visibility for CAT I precision approaches is 250' and ¾ statute mile.

Figure A3.4. Portion of Clear Zone Affecting CAT I Minimums.



A3.3. Category II/III ILS Precision Minimums Requirements.

A3.3.1. Ground Equipment. As required by applicable military directives

A3.3.2. Lighting Facilities. As required by applicable military directives.

A3.3.3. Marking And Signs. As required by applicable military directives.

A3.3.4. Approach Minimums. CAT II/III procedures require special authorization from the FAA or applicable military authority. **Table A3.1.** lists lowest authorized minimums, but individual operators may require higher minimums. Higher minimums may also be necessary based on environmental factors in the vicinity of the airport or other Flight Standards or military requirements. Class II/T/2 facility class of performance is required for CAT II operations. The lowest CAT II height above threshold (HAT)/RVR values in feet are 100/1,200. **Table A3.1.** lists RVR values for HAT values greater than 100.

Table A3.1. Lowest CAT II Minimums.

HAT (feet)	RVR (feet)
101-140 (1-40 adjustment)	1200*
141-180 (41-80 adjustment)	1600
181-199 (81-99 adjustment)	1800

NOTE: Chart the lowest authorized CAT II RVR
*As low as 1000 by Ops Spec

A3.3.4.1. Adjustment of CAT II Minimums. The HAT is measured in feet from the highest elevation of the runway in the touchdown area, and runway visual range (RVR) in feet. The lowest attainable values are a HAT of 100 feet and RVR of 1,200 feet. Application of CAT II obstruction clearance criteria may identify objects that exceed the allowable height in the touchdown area or penetrate the approach light surface. In such cases, adjustment to the decision height shall be made as follows:

A3.3.4.1.1. Final Approach Surface. Requires a special study of local features and conditions before CAT II operations can be authorized.

A3.3.4.1.2. Approach Light Surface and Touchdown Area. Adjust the decision height (DH) upward one-foot for each foot an object exceeds the allowable height. The RVR value will then be adjusted as indicated in **Table A3.1.**

A3.3.4.1.3. Minimum HAT Value. The minimum HAT value for CAT II operations is 100 feet where the runway centerline to taxiway centerline separation is 600 feet or greater. This value may be also be achieved with:

A3.3.4.1.3.1. Runway taxiway centerline separation of 500 feet at elevations of 4,000 feet and below, provided taxi operations are restricted to aircraft with wingspans less than 214 feet and tail heights less than 66 feet.

A3.3.4.1.3.2. Runway taxiway centerline separation of 400 feet at elevations of 4,000 feet and below, provided taxi operations are restricted to aircraft with wingspans less than 171 feet and tail heights less than 55 feet.

A3.3.4.1.3.3. Larger aircraft flying the approach or taxiing on parallel taxiways, or taxiway/runway separation less than stated above require a collision risk analysis to determine the minimum HAT value.

A3.3.4.2. CAT II/III Minimums restrictions. Publish the lowest authorized CAT III RVR when the runway supports unrestricted CAT I and II operations. When CAT I or II operations for a runway are restricted, CAT III minimums for the runway must be determined by a collision risk analysis. The following is the minimum class of performance (AC 120-29, appendix 2) required for an ILS to support a published FAR Part 97 CAT II or III, Standard Instrument Approach Procedure (SIAP):

A3.3.4.2.1. Class III/D/3. Required for Cat III operations with visibility ≥? RVR 600.

NOTE: CAT III procedures with facility class III-D3 performance require the notation "Localizer not suitable for Electronic Rollout Guidance."

A3.3.4.2.2. Class III/E/3. Required for CAT III operations with visibility ≥ ?RVR 600.

A3.3.4.2.3. Class III/E/4. Required for CAT III operations with visibility < RVR 600.

A3.3.5. Final Approach Segment. Develop the final approach segment under TERPS Volume 3, Chapter 3 criteria, with the following exceptions:

A3.3.5.1. Final Approach Course Alignment. The final course alignment must be coincident with the runway centerline.

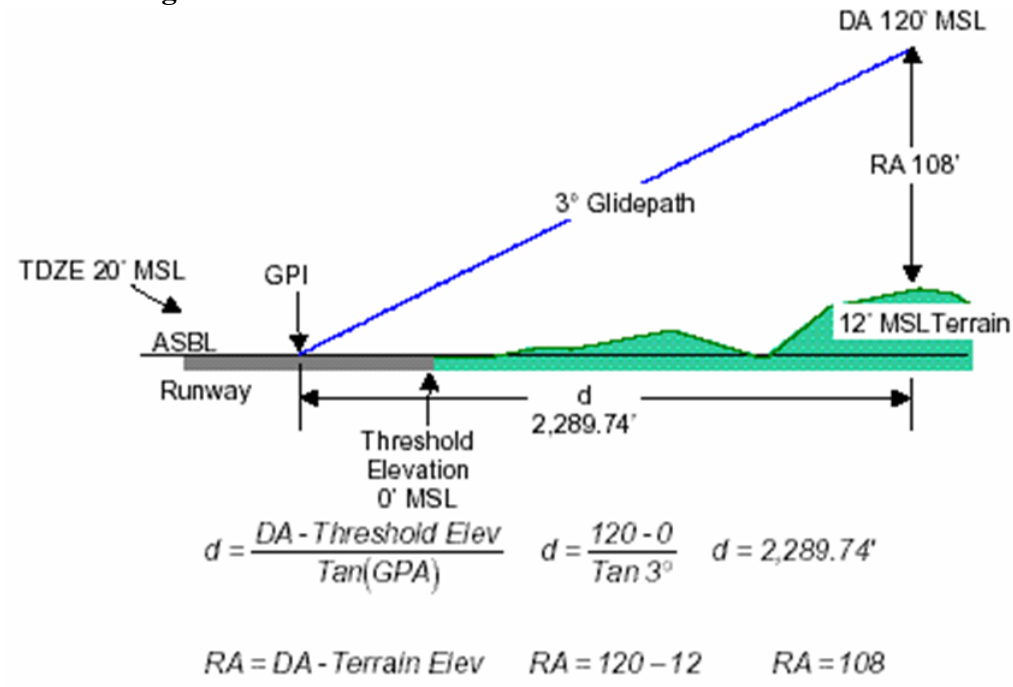
A3.3.5.2. Final Segment Obstacle Clearance Surface (OCS) Penetrations. Penetrations of the primary (W, X) surfaces are not authorized. Taxiing aircraft are obstructions in the final segment analysis. If the "W" or "X" surface is penetrated by a taxiing aircraft (tail height), request a collision risk analysis and approval from the Flight Procedure Standards Branch, AFS-420, P.O. Box 25082, Oklahoma City, Oklahoma, 73125.

A3.3.5.3. Obstruction Assessment. Evaluate the final segment under Chapter 3 of AFMAN 11-226(I) TERPS Volume 3. If DH adjustments are required for obstruction penetrations in the "Y" surface, adjust the HAT upward one foot for each foot the penetration exceeds the allowable height.

A3.3.5.4. Approach Light Area. FAA Airports Division or USAF Civil Engineering is responsible for maintaining obstruction requirements in AC 150/5300-13, Airport Design and applicable military directives. Obstructions shall not penetrate the approach light area.

A3.3.6. Calculation of Radio Altimeter (RA) Height. To determine the RA height, determine the distance (d) from ground point of intercept (GPI) to the point Decision Altitude (DA) occurs. Obtain the terrain elevation 'd' feet from GPI on runway centerline extended. Subtract the terrain elevation from the DA to calculate the DA (see **Figure A3.5.**).

Figure A3.5. Calculating RA.



A3.3.7. Missed Approach Obstruction Evaluation For Cat II And III. Section 1 of the missed approach segment is significantly different from the CAT I precision standard. The CAT II/III Section 1 begins at the end of the final OCS trapezoid, is aligned with the final approach course, and continues in the direction of landing for a distance of 1.5 NM. It is comprised of 3 subsections: Section 1A, Section 1B, and Section 1C. The section 1 OCS's should not be penetrated except by NAVAID's and ancillary facilities fixed by functional purpose.

A3.3.7.1. Acceptable obstructions are as follows:

A3.3.7.1.1. All Visual Aids on Frangible Mounts. For approach lighting system components including visual glide slope indicators (VGSI's), the maximum height is as specified by the latest edition of Order 6850.2 or applicable military directive. For taxiway signs, the latest edition of AC 150/5340-18 or applicable military directive specifies the maximum height.

A3.3.7.1.2. ILS glide slope antenna or monitor masts and automated surface observing system (ASOS) wind sensor towers, which are permitted to exceed 15 feet above the elevation of the points on the runway centerline abeam them.

A3.3.7.1.3. Glide slope shelter, precision approach radar (PAR), RVR, and ASOS components, which shall not exceed a height of 15 feet above the elevation of the point on the runway centerline abeam them (except ASOS wind sensor towers, which may exceed 15 feet). These structures are recommended to be located at least 400 feet from runway centerline; the minimum distance is specified in AC 6750-16, , except where an RVR component must be sited less than 400 feet from runway centerline. Obstructions more than 15 feet above the runway centerline elevation may be permitted if the minimum distance from the runway centerline is increased 10 feet for each foot the structure exceeds 15 feet. Frangible PAR reflectors are not considered obstructions.

A3.3.7.1.4. Aircraft taxiing via a parallel or adjacent taxiway and clear of the obstacle free zone (OFZ) or runway primary surface/clear zone (see AC 150/5300-13 or UFC-3-260-01) may penetrate the CAT II/III missed approach surfaces provided the runway centerline to taxiway centerline distances and aircraft dimensions standards contained in paragraph **A3.3.4.1.3.** are met. Perform a collision risk analysis where the airport elevation is greater than 4,000 feet MSL, where aircraft with wingspans or tail heights are greater than in the specified paragraphs, or for taxi on existing or proposed taxiways that are less than the specified distances from runway centerline. Supporting data required for completing the ICAO Collision Risk Model (CRM) analysis is contained in FAA Order 8260.4, ILS Obstacle Risk Analysis. The data includes airport elevation, largest aircraft type, estimated number of this type of aircraft that could typically be occupying the parallel taxiway during CAT II or III operations, and all obstructions relevant to a CRM analysis in the vicinity of the airport. When taxiing operation as described above during CAT II/III operations are required, the procedure becomes non-standard and requires AF Flight Standards approval. Required operational conditions and/or limitations will be specified in the approval documentation.

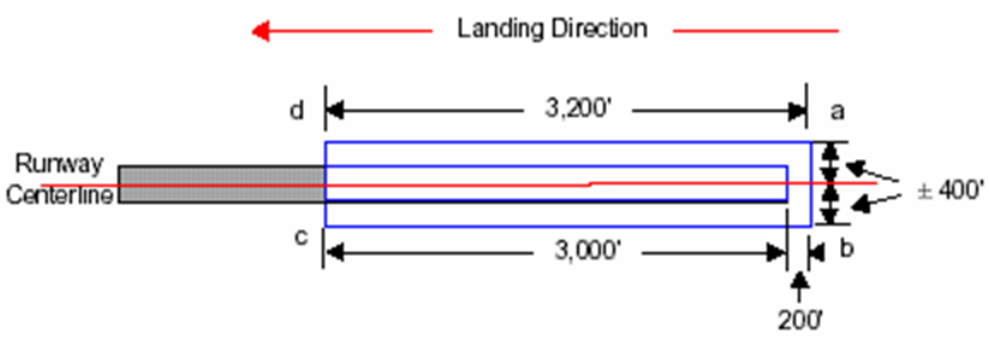
A3.3.7.2. Section 1A. Section 1A is the touchdown area. See **Figure A3.6.**.

A3.3.7.2.1. Area.

A3.3.7.2.1.1. Length. Section 1A begins at the end of the final "W" OCS area (ab line). It extends a distance of 3,200 feet in the direction of landing to a point 3,000 feet from runway threshold (RWT) (cd line).

A3.3.7.2.1.2. Width. Total width of the area is 800 feet (+/- ?400’ from centerline).

Figure A3.6. Section 1A Touchdown Area.



A3.3.7.2.2. OCS. The surface elevation within this area is equal to the elevation of a point on the runway centerline perpendicular to the obstruction being evaluated. The only obstructions permitted in the touchdown area are those obstructions that are fixed by their functional purpose or those required for the approaches. Parked aircraft are not permitted within this area. This area must be free of obstruction penetrations, except for frangible visual NAVAID’s that are required for CAT II and III operations. All obstructions, except visual aids and frangible functional objects, must be marked and lighted in accordance with AC 150/5340-18, Standards for Airport Sign Systems, or applicable military directives unless shielded by a properly lighted and marked object.

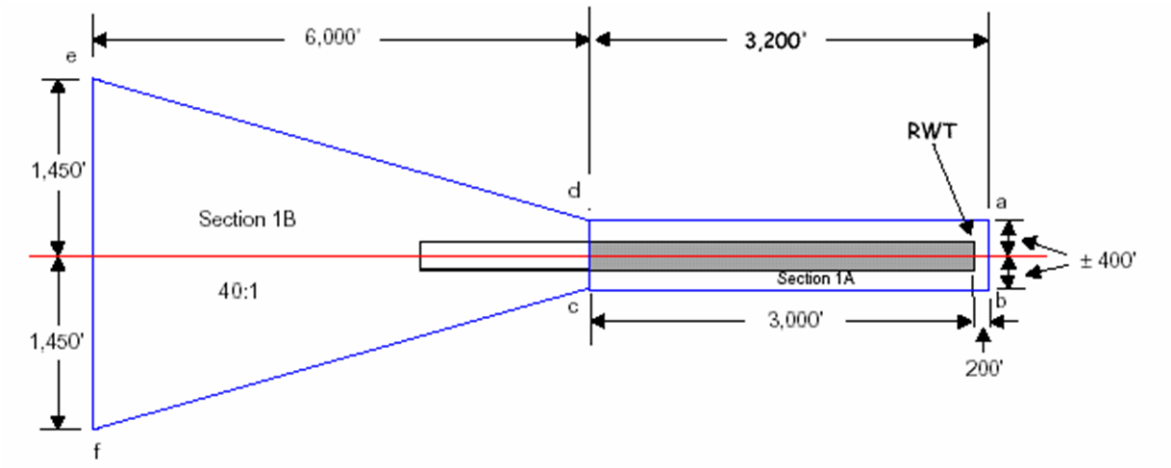
A3.3.7.3. Section 1B. Section 1B begins along a line defining the end of section 1A (cd line) (see **Figure A3.7.**).

A3.3.7.3.1. Area.

A3.3.7.3.1.1. Length. The area extends 6,000 feet from the cd line along the runway centerline.

A3.3.7.3.1.2. Width. The area expands from +/-?400 feet at the cd line to +/-1,450 feet at the end of the section (ef line).

Figure A3.7. Section 1B.



A3.3.7.3.1.3. OCS. Section 1B is a 40:1 surface that begins at the elevation of the runway centerline 3,000 feet from the RWT, and rises to a height of 150 feet above ASBL. Evaluate obstructions using the shortest distance from the obstruction to the beginning of section 1B (cd line). This surface must be free of penetrations to approve CAT II or III operations.

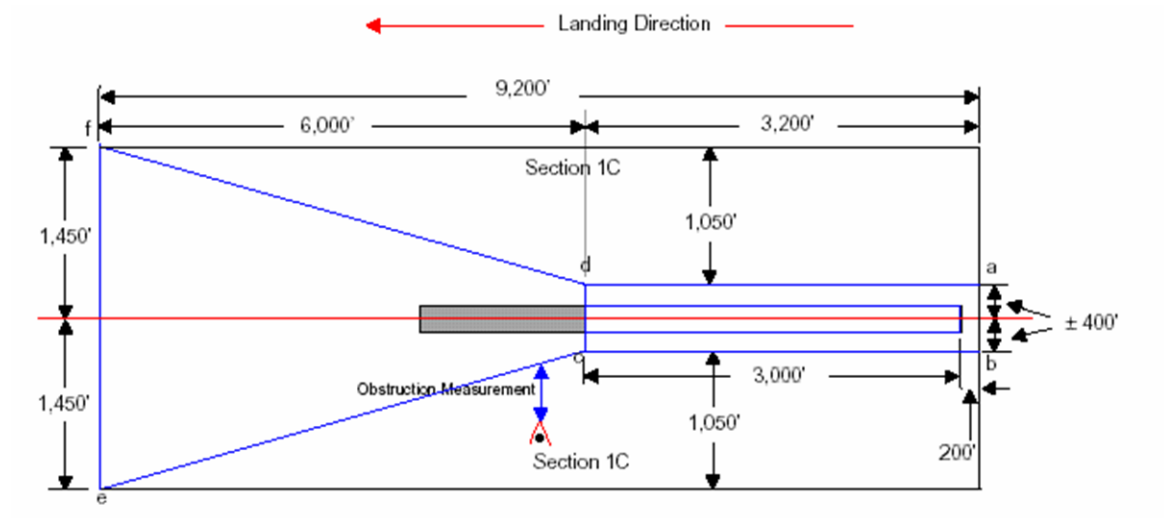
A3.3.7.4. Section 1C. Touchdown Area Transitional Surfaces (see **Figure A3.8.**).

A3.3.7.4.1. Area. Section 1C consists of two parts, one on each side of the runway adjacent to sections 1A and 1B. The areas begin at the beginning of section 1A (ab line) and extend in the direction of landing.

A3.3.7.4.2. Length. The length of Section 1C is approximately 1.5 NM (9,200 feet).

A3.3.7.4.3. Width. The width of the section is 1,050 feet from its beginning (ab line) to a point abeam the cd line. This width tapers from 1,050 feet abeam the cd line,to zero at the end of section 1B (ef line).

Figure A3.8. Section 1C.



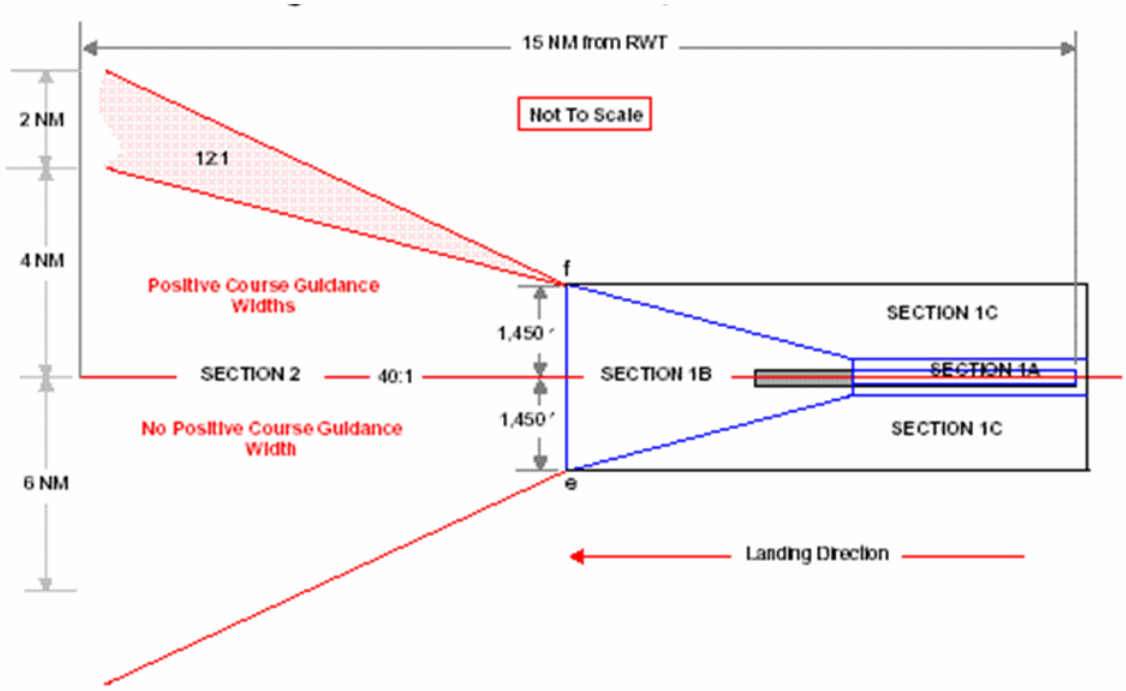
A3.3.7.4.3. OCS. Section 1C is a 7:1 surface that rises perpendicular to the missed approach course from the elevation and boundary edge of section 1A or B to a height of approximately 150 feet above the ASBL. Evaluate obstructions measuring perpendicular to the missed approach course, from the outer edge of section 1A or 1B to the obstruction. The OCS should not be penetrated. A structure, such as a building or tower, which penetrates section 1C is an obstruction to CAT II/III landing operations even when the same obstruction does not penetrate the imaginary surfaces. When fixed obstructions penetrate the OCS, the procedure becomes non-standard. When deemed necessary and approved by AF Flight Standards, adjust RVR minimums commensurate with the degree of interference presented by the obstruction. Publish the RVR required in application of **Table A3.1.** as if the HAT were adjusted for the penetration. Do not adjust the HAT. Add a cautionary note to the approach procedure to identify the obstruction. Parked aircraft that penetrate section 1C are considered an obstruction to CAT II/III landing operations.

A3.3.7.5. Section 2. See **Figure A3.9.**.

A3.3.7.5.1. Area.

A3.3.7.5.1.1. Straight-ahead Missed Approach Area. This portion of the area starts at the end of section 1 and is centered on a continuation of the section 1 course. The width increases uniformly from 3,100 feet at the beginning to 12 miles at a point 15 miles from the runway threshold. When positive course guidance is provided for the missed approach procedure, secondary reduction areas which are zero miles wide at the point of beginning and increase uniformly to 2 miles wide at the end of Section 2, must be added to Section 2 (see **Figure A3.9.**).

Figure A3.9. Section 2, Non-RNAV.



A3.3.7.5.1.2. Turning Missed Approach Area. (Applies to turns of over 15°). See **Figure A3.10.** and **Figure A3.11.**. The design of the turning missed approach area assumes that aircraft missing an approach will climb straight ahead until reaching a height of at least 300 feet above the elevation of the runway centerline at the end of the touchdown area. The procedure will identify the obstruction if a turn toward a significant obstruction has to be made. The turning flight track radius shall be 1.75 miles and it shall be plotted to begin at the end of Section 1. The outer boundary of section 2 shall be drawn with a 3.5 mile radius. The inner boundary line shall commence at the outer edge of the Section 1C surface opposite the end of the touchdown area. The outer and inner boundary lines shall terminate at points 4 miles each side of the assumed flight track 15 miles from the runway threshold. Where secondary areas are required, they shall commence after completion of the turn. Turns in the missed approach area are normally specified to commence after reaching a height of 300 feet. Where an operational requirement exists to continue the climb of the aircraft to a height of more than 300 feet prior to commencing a turn, Section 1 will continue to increase uniformly in width, and will be extended longitudinally 4,000 feet for each 100 feet of height over 300 feet. In addition, Section 1C is also extended laterally on the inside of the turn to a height equal to the elevation attained by the extension of Section 1.

A3.3.7.5.1.3. Obstructions in the Missed Approach Area. The 40:1 missed approach surface identifies obstructions which may be a hazard in the missed approach area. When an object penetrates the 40:1 surface, the missed approach procedure will contain a note specifying the minimum rate of climb required to clear the obstruction by the number of feet determined by the following formula: Clearance=0.31579 x (obstruction height above DER). The climb gradient is effective until reaching a hundred-foot (3,100; 1,600; etc.) altitude from which the 40:1 surface is clear. Do not publish climb gradients less than 152 feet/NM.

Figure A3.10. Turning Missed Approach Detail.

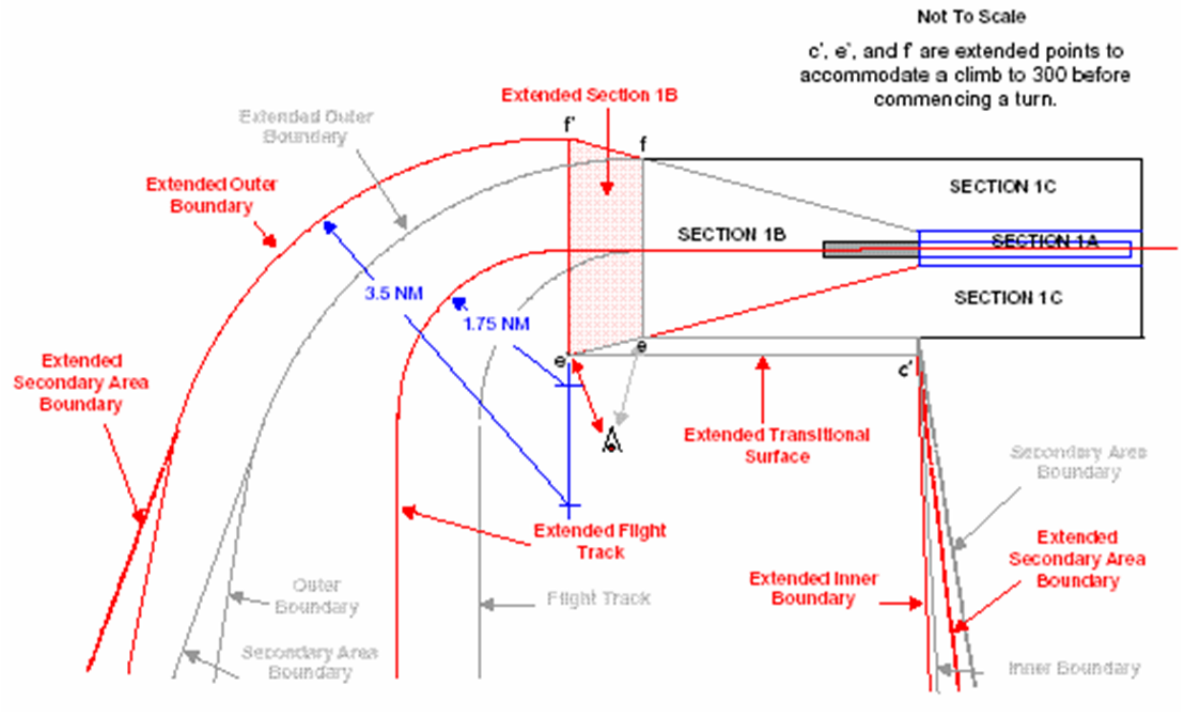
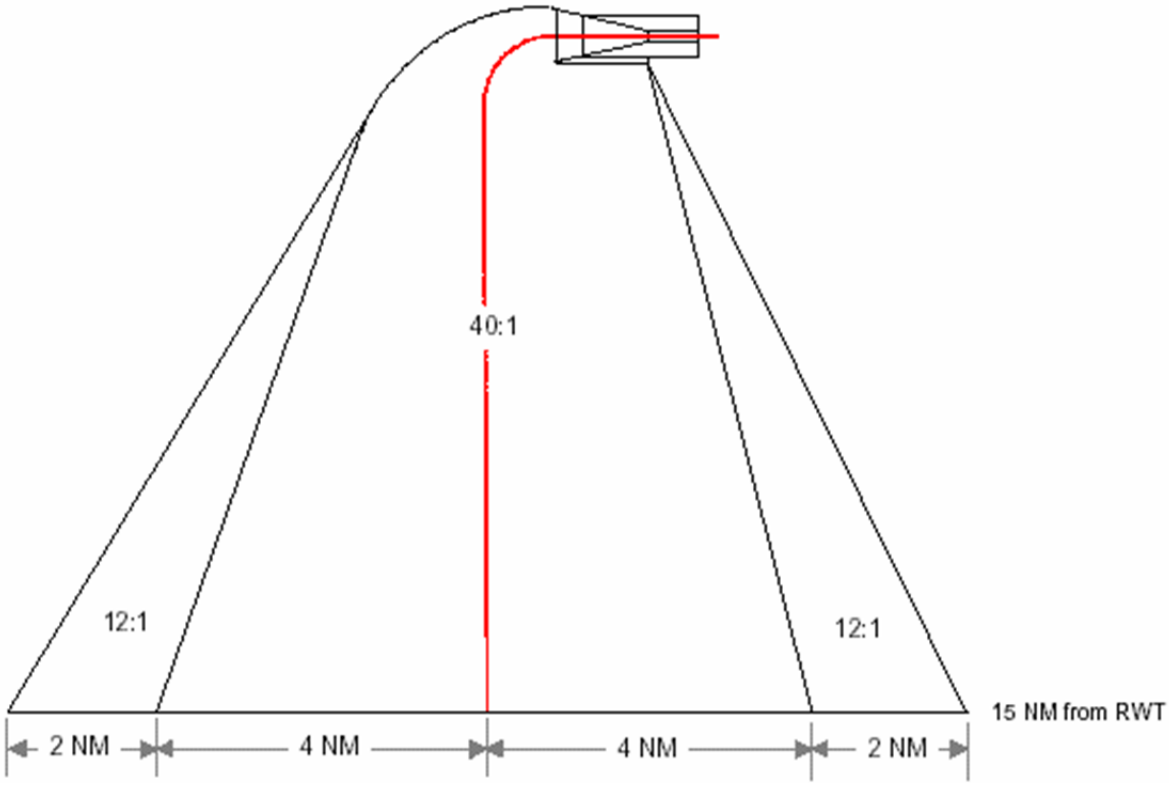


Figure A3.11. Turning Missed Approach Detail - continued.



A3.4. AFMAN 11-226 (I), Volume 1, paragraph 142, Changes. DELETED.

A3.5. AFMAN 11-226 (I), Volume 1, paragraph 150d, Coordinating Airspace Action. DELETED.

A3.6. AFMAN 11-226 (I), Volume 1, paragraph 161, Straight-In Procedure Identification. DELETED.

A3.7. AFMAN 11-226 (I), Volume 1, paragraph 163, Differentiation. DELETED.

A3.8. AFMAN 11-226 (I), Volume 1, paragraph 211, Positive Course Guidance. DELETED.

A3.9. AFMAN 11-226 (I), Volume 1, paragraph 221, Minimum Safe Altitudes. DELETED.

A3.10. AFMAN 11-226 (I), Volume 1, paragraph 221b, Emergency Safe Altitudes. DELETED.

A3.11. AFMAN 11-226 (I), Volume 1, paragraph 232a[2] and Table 1, Initial Approach Segments Based on Straight Course and Arcs With Positive Course Guidance. DELETED.

A3.12. AFMAN 11-226 (I), Volume 1, paragraph 235, Initial Approach Based On High Altitude Teardrop. DELETED.

A3.13. AFMAN 11-226 (I), Volume 1, paragraph 252, Descent Angle/Gradient. DELETED.

A3.14. AFMAN 11-226 (I), Volume 1, paragraph 253, Visual Descent Point. DELETED.

A3.15. AFJMAN 11-226, Volume 1, paragraph 261, Circling Approach Area Not Considered for Obstacle Clearance. DELETED.

A3.16. AFMAN 11-226 (I), Volume 1, paragraph 270, Missed Approach Segment. DELETED.

A3.17. AFMAN 11-226 (I), Volume 1, paragraph 272, Missed Approach Point. DELETED.

A3.18. AFMAN 11-226 (I), Volume 1, paragraph 274, Straight Missed Approach Obstacle Clearance. DELETED.

A3.19. AFMAN 11-226 (I), Volume 1, paragraph 282, DME Fixes. DELETED.

A3.20. AFMAN 11-226 (I), Volume 1, paragraph 310, Takeoff and Landing Minimums. DELETED.

A3.21. AFMAN 11-226 (I), Volume 1, paragraph 320, Height Above Touchdown, HAT. DELETED.

A3.22. AFMAN 11-226 (I), Volume 1, paragraph 323c, Minimums Adjustments. DELETED.

A3.23. AFMAN 11-226 (I), Volume 1, paragraph 330c(2), Establishment of Visibility Minimums. DELETED.

A3.24. AFMAN 11-226 (I), Volume 1, paragraph 334c, Runway Requirement for Approval of RVR. DELETED.

A3.25. AFMAN 11-226 (I), Volume 1, paragraph 342a, Runway Marking Obscuration. DELETED.

A3.26. AFMAN 11-226 (I), Volume 1, paragraph 343e, Visibility Reduction. DELETED.

A3.27. AFMAN 11-226 (I), Volume 1, paragraphs 513a[1][a] and 713a[1][a]. DELETED.

A3.28. AFMAN 11-226 (I), Volume 1, paragraph 523b, Final Approach Segment. DELETED.

A3.29. AFMAN 11-226 (I), Volume 1, paragraph 613c(1) and 713c(1), Obstacle Clearance. DELETED.

A3.30. AFMAN 11-226 (I), Volume 1, paragraph 952, Alignment. DELETED.

A3.31. AFMAN 11-226, Volume 1, paragraph 1750c(2), LF Airways and Routes. DELETED.

A3.32. AFMAN 11-226, Volume 1, paragraph 1750 d.(2)(a), LF Airways and Routes. DELETED.

A3.33. AFMAN 11-226 (I), Volume 1, Appendix 5, paragraph 1, Approach Lighting Systems. DELETED.

A3.34. AFMAN 11-226 (I), Volume 3, paragraph 2.3, En Route, Initial, Intermediate Segments. DELETED.

A3.35. AFMAN 11-226 (I), Volume 3, paragraph 2.9.1, Distance Measuring Equipment (DME). DELETED.

Attachment 4

TERMINAL INSTRUMENT PROCEDURES GUIDE

A4.1. GPI, RPI, TCH Computations.

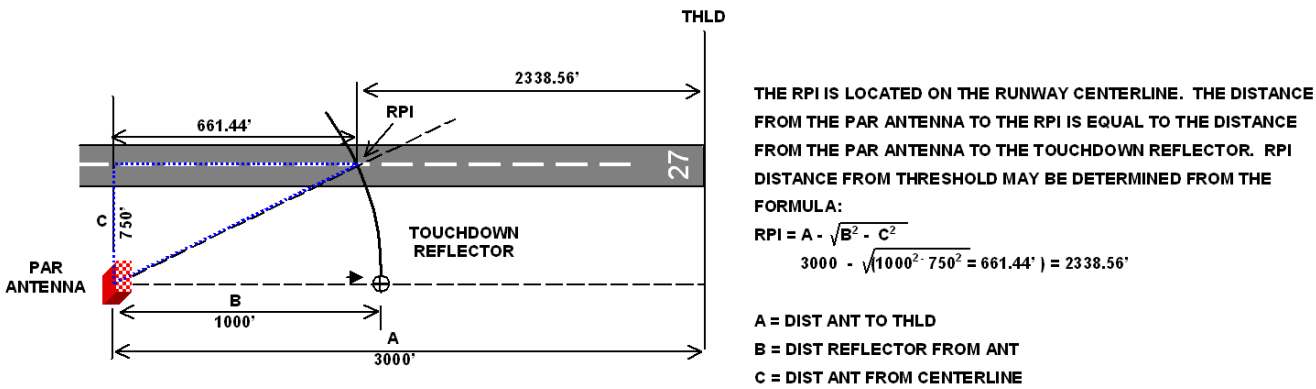
A4.1.1. Calculate GPI, RPI, and TCH for ILS procedures as detailed in **Figure A4.1.** through **Figure A4.3.** Factors that influence these computations include the glidepath angle (GPA), runway threshold elevation, glideslope antenna elevation, glideslope antenna to threshold distance, and runway crown elevation abeam glideslope antenna. The formulas vary based on whether the runway "slope" or gradient is positive or negative. Slope is negative if the threshold elevation is higher than that of the "RPI" and positive if the threshold elevation is lower. Always use Rapidly Dropping Terrain calculations. These calculations may also be used for MMLS procedures. Replace ILS glideslope antenna to threshold distance with MMLS elevation antenna to threshold distance. Also add the height of center of the elevation antenna phase array (normally 5 ft) to the elevation antenna site elevation and use in the place of the ILS glideslope antenna elevation.

A4.1.2. For GPN 22/25, TPN-19 PAR systems, RPI computations are not necessary. The RPI is determined during system installation, and may be confirmed by the checking the "Touchdown (Kft)" value on the site parameter panel.

NOTE: This value is from RPI to the point abeam the PAR antenna. In order to use this RPI value (i.e. for coincidence issues, or FAA Form 8240-22 Facility Data Sheet input) the number must be converted to distance from threshold.

A4.1.3. For FPN-16/62, MPN-14K PAR systems, the RPI (touchdown) will be located at a point where an arc swung from the PAR antenna to the touchdown reflector crosses the runway centerline (see **Figure A4.4.**):

Figure A4.4. PAR RPI Distance from Runway Threshold.



A4.6. 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 is commonly referred to as 'slave' variation. Variation applied to an airfield is commonly referred to as 'area' variation.

A4.6.1. 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 degrees, subtract 360 degrees to convert the result to a positive value between 0 and 360 degrees.

Table A4.1. East Variation.

When Converting:	Apply the following:
True to Magnetic with East Variation	**TRUE - VARIATION = MAGNETIC** Example: 11° East Variation 355° True – 11° = 344° Magnetic
Magnetic to True with East Variation	**MAGNETIC + VARIATION = TRUE** Example: 11° East Variation 355° True + 011° = 006° True (366° - 360° = 006°)

A4.6.2. 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 degrees, subtract 360 degrees to convert the result to a positive value between 0 and 360 degrees.

Table A4.2. West Variation.

When Converting:	Apply the following:
True to Magnetic with West Variation	**TRUE - VARIATION = MAGNETIC** Example: 11° West Variation 355° True + 11° = 006° Magnetic (366° - 360° = 006°)
Magnetic to True with West Variation	**MAGNETIC + VARIATION = TRUE** Example: 11° West Variation 355° True – 011° = 344° True

A4.10. Calculating Missed Approach Climb Gradients. The following guidance applies when there is a penetration of the missed approach obstacle clearance surfaces and other options (DA/MDA adjustment) is not feasible (nonstandard procedure);

A4.10.1. Within the CONUS, Alaska, and Hawaii , use the following formula for precision missed approach;

$$h = Oe - (DA - [\tan(gpa) \times 1460])$$

$$CG = \frac{h}{0.76 \times d}$$

Where Oe = Obs. MSL elev + vert. accuracy (*for obstacles in secondary area use equivalent height)

d = Shortest distance (NM) from end of section 1A to obstructio n

GPA = glide path angle

Example :

$$332 = \frac{1549 - (300 - [\tan(3.00) \times 1460])}{0.76 \times 5.26}$$

Where Oe = 1549 feet MSL

DA = 300 feet MSL

GPA = 3.00°

d = 5.26 NM

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.

Example: ROC = 0.24(CG x d) 419.11 = 0.24(332x5.26) 420+1549=1969 (round up to next 100 ft. increment).

Publish the following note "CAUTION: Missed Approach Climb Rate to 2000" above the minimum climb table.

NOTE: 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.

A4.10.2. Within the CONUS, Alaska, and Hawaii , use the following formula for non-precision missed approach;

$$h = Oe - (MDA - [ROC + Adj])$$

$$CG = \frac{h}{0.76 \times d}$$

Where $Oe = \text{Obs.MSL elev} + \text{vert. accuracy}$ (*for obstacles in secondary area use equivalent height)

$d = \text{Shortest distance (NM) from start of missed approach area}$

Example :

$$344.95 = \frac{1549 - (420 - 250)}{0.76 \times 5.26NM}$$

Where $Oe = 1549$ feet MSL

$MDA = 420$ feet MSL

$d = 5.26$ NM

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.

Example: ROC = 0.24(CG x d) 435.52 = 0.24(345x5.26) 436+1549=1985 (round up to next 100-foot increment). Publish the following note "CAUTION: Missed Approach Climb Rate to 2000" above the minimum climb table.

NOTE: 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.

A4.10.3. Calculating Missed Approach Climb Gradients OCONUS where AFMAN 11-226(I) criteria is applied (excludes host nation or locations where the USAF exercises TERPS authority where ICAO/ NATO criteria is applied). Also applicable CONUS if operationally required (procedure annotated 'NOT FOR CIVIL USE').

A4.10.3.1. Precision. (Applicable only to Section 2. For Section 1 penetrations, only DA adjustments are authorized).

A4.10.3.1.1. Apply the applicable Section 2 missed approach criteria from Volume 3, Chapter 3 to determine the amount of penetration of the MA surface, in feet.

A4.10.3.1.2. Divide the amount of penetration by the NM distance 'D' from the OCS calculations (shortest distance from the obstacle to the 'a-b' line at the end of Section 1). The resultant value is equal to the difference between the standard OCS and the OCS required to clear the penetrating obstacle.

A4.10.3.1.3. Add 200 to the result of **A4.10.3.1.2.** and round up to the next 10-foot increment. The resultant value equals the minimum publishable CG to clear the obstruction with the required ROC.

A4.10.3.1.4. Calculate the 'climb-to' altitude by multiplying the published CG from paragraph **A4.10.3.1.3.** by the NM distance 'D' determined in **A4.10.3.1.2.**. Round the results to the higher 100-foot value and publish the rounded value as the missed approach climb gradient.

A4.10.3.2. Non-precision.

A4.10.3.2.1. Apply the applicable missed approach criteria from Volume 1, Chapter 2 to determine the amount of penetration of the MA surface, in feet.

A4.10.3.2.2. 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.

A4.10.3.2.3. Add 200 to the result of **A4.10.3.2.2.** and round up to the next 10-foot increment. The resultant value equals the minimum publishable CG to clear the obstruction with the required ROC.

A4.10.3.2.4. Calculate the 'climb-to' altitude by multiplying the published CG from paragraph **A4.10.3.2.3.** by the NM distance 'D' determined in **A4.10.3.2.2.**. Round the results to the higher 100-foot value and publish the rounded value as the missed approach climb gradient.

Attachment 5

CHECKLIST for REVIEW of HOST NATION INSTRUMENT PROCEDURE PROGRAMS and AIRPORTS

NOTE 1: Each checklist item applies to both Airports and Programs except item A5.2.

NOTE 2: Each checklist item applies to both the accredited and the special accredited status except items A5.13 and A5.14.

Accreditation Checklist Items	YES	NO	N/A
A5.1. Do government authorities from an ICAO member nation or a Special Administrative Region (SAR) manage the candidate's program/airport?			
A5.2. Is the candidate program in a country that meets ICAO standards IAW the FAA IASA Program? ***NOTE:*** This item is not applicable (N/A) to individual airports.			
A5.3. When a single host nation AIP covers more than one country, are individual candidate's methods and practices clearly discernible?			
A5.4. When a single AIP covers military and civilian procedures, does the AIP specify methods and practices employed by each?			
A5.5. Is U.S. TERPS, ICAO PANS-OPS, or NATO criteria utilized for the design of instrument procedures, including departure procedures? ***NOTE:*** Each set of criteria/procedures above is accepted; identify which one is used.			
A5.6. Is flight inspection performed to standards outlined in ICAO Annex 10 or FAA Order 8200.1, even when performed by a private company/ government contractor?			
A5.7. Have all host declared exceptions to any of the accepted criteria or ICAO procedures been documented and forwarded to AFFSA/XOIP for review?			
A5.8. Does the MAJCOM TERPS function have an open line of communication with the host nation instrument procedure/aviation data OPR(s) to enhance AIP/individual procedure currency and maintainability?			
A5.9. Does the host nation staff for the program or airport being evaluated develop and send NOTAMs when required to ensure their published instrument procedures remain accurate?			
A5.10. Does the MAJCOM TERPS function receive host nation NOTAMs soon enough to ensure corrective action(s) can be taken on published DoD instrument procedures *before the host change is effective*?			
A5.11. Are host NOTAMs for temporary/permanent instrument procedure changes being incorporated into the US NOTAM system?			

Accreditation Checklist Items	YES	NO	N/A
A5.12. Does host nation source data indicate that the candidate program publishes coordinates in the WGS-84 datum? ***NOTE:*** When 'NO', identify the datum(s) used. When 'YES', document whether the WGS-84 coordinates are derived via survey or via mathematical conversion.			
A5.13. Does the candidate program publish all host nation source documentation (AIP, FLIP data, NOTAMs, etc.) in easily understandable English? ***NOTE:*** This item is not applicable (N/A) to accredited candidates.			
A5.14. Does the candidate program conduct a 'post-production review' of their published instrument procedures? ***NOTE:*** This item is not applicable (N/A) to accredited candidates.			
A5.15. Based on documented MAJCOM experience with this candidate, does the instrument procedure program continually demonstrate the ability to develop and publish instrument procedures that are safe, flyable and meet accepted criteria?			

Attachment 6

CHECKLIST FOR SPECIAL ACCREDITATION OF HOST NATIONS/AIRPORTS.

DELETED.

Attachment 7

CHECKLIST for REVIEW and/or PUBLICATION of FOREIGN TERMINAL INSTRUMENT PROCEDURES

CHECKLIST ITEM	CONFORMS TO _____ CRITERIA			CHECKLIST ITEM	CONFORMS TO _____ CRITERIA		
MSA	YES	NO	N/A	**MISSED APPROACH SEGMENT**	YES	NO	N/A
NAVAID				COURSE ALIGNMENT			
SOURCE				CLIMB GRADIENT			
				SPECIAL NOTES			
HOLDING PATTERNS	YES	NO	N/A	REVIEW WORDING OF MISSED APPROACH INSTRUCTIONS			
LEG LENGTH							
NO COURSE SIGNAL ZONE							
AIRSPEED REQUIREMENTS				**PLANVIEW**	YES	NO	N/A
				LEGIBILITY			
INITIAL SEGMENT	YES	NO	N/A	RESTRICTIONS			
FIX IDENTIFICATION				SPECIAL NOTES			
ALTITUDES							
TEARDROP ANGLE OF DIVERGENCE				**PROFILE**	YES	NO	N/A
				LEGIBILITY			
ARC LENGTH				RESTRICTIONS			
SEGMENT LENGTH				SPECIAL NOTES			
DESCENT GRADIENT							
LEAD RADIAL							
COURSE ALIGNMENT							
SPECIAL NOTES							
INTERMEDIATE SEGMENT	YES	NO	N/A				
FIX IDENTIFICATION							
ALTITUDES							
SEGMENT LENGTH				**DEPARTURE PROCEDURES**	YES	NO	N/A
DESCENT GRADIENT				Has the host nation established departure procedures for obstacle avoidance?			
LEAD RADIAL							
COURSE ALIGNMENT							
SPECIAL NOTES				DER CROSSING HEIGHT			
				CLOSE-IN OBSTACLE DEPICTION			
FINAL SEGMENT	YES	NO	N/A	EARLY TURNS			
FIX IDENTIFICATION				CLIMB GRADIENTS			
ALTITUDES				CROSSING ALTITUDES			
SEGMENT LENGTH				POSITIVE COURSE GUIDANCE			
DESCENT GRADIENT				SPECIAL NOTES			
COURSE ALIGNMENT				RESTRICTIONS			

CHECKLIST ITEM	CONFORMS TO _____ CRITERIA			CHECKLIST ITEM	CONFORMS TO _____ CRITERIA		
STEP DOWN FIX(ES)				COMPLEXITY (Determine if text, graphic, or both depictions are needed)	Text	Graphic	Both
MAP LOCATION							
THRESHOLD CROSSING HEIGHT							
MINIMUMS				**FLYABILITY CHECK**	YES	NO	N/A
SPECIAL NOTES				Does the TERPS Specialist have any specific areas of concern?			
CIRCLING	YES	NO	N/A				
RESTRICTIONS				**MISCELLANEOUS**	YES	NO	N/A
SPECIAL NOTES				Do the primary areas of any segment overlap any Special Use Airspace?			
Specialist's Printed Name: _____				Specialist's Signature: _____ Date: _____			

Attachment 8

INSTRUMENT PROCEDURE FLYABILITY CHECK INSTRUCTIONS

A8.1. Instrument procedure flyability checks are flown to ensure procedures are safe, practical, and consistent with good operating procedures. Flyability checks are NOT official flight inspections ('flight checks'), but shall include the entire procedure including the missed approach segment and all holding patterns. Flyability Checks are documented on AF IMT 3992, ***Instrument Procedure Flyability Check, Instrument Approach Procedure (IAP)*** or AF IMT 3993, ***Instrument Procedure Flyability Check, Departure Procedure (DP),*** whichever is appropriate. These forms shall be maintained with the TERPS procedure package. See paragraph **7.3.** for additional guidance when conducting flyability checks at host nation locations.

A8.5. Flyability check IMTs should be reviewed before the flyability check is flown. Complete the flyability check (see examples at **Figure A8.1.**, **Figure A8.2.** or **Figure A8.3.**) and sign. Any comments should be written in the remarks section. Whenever possible, the pilot should personally debrief the TERPS specialist responsible for the procedure. Remember, recommendations are always welcome.

Figure A8.1. 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 A8.2. 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 Comm (789) 777-6789

AF IMT 3992, 19961201, V2 (REVERSE)

Figure A8.3. 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 Comm (789) 777-6789	123 AW AMC

AF IMT 3993, 19961201, V3

Attachment 9

USE of INTERNATIONAL CRITERIA

A9.1. Introduction. Outside the contiguous United States, the majority of nations use a variation of International Civil Aviation Organization (ICAO) Document 8168-OPS/611, *Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) Volume II, Construction of Visual and Instrument Flight Procedures*, for the development of instrument approach and departure procedures. As of July 2003, North Atlantic Treaty Organization (NATO), along with Partners for Peace (PfP) nations have adopted ICAO criteria and use NATO Standardization Agreement (STANAG) 3759, *NATO Supplement to ICAO Doc 8168-OPS/611, Volume II, For the Preparation of Instrument Approach and Departure Procedures - AATCP-1(B)*, to address military specific requirements such as TACAN and approach minima. Additionally, STANAG 3759 has been accepted by Air Standardization Coordinating Committee (ASCC) nations (United Kingdom, Canada, New Zealand, Australia and the United States) as Air Standard (AS) 90/07 making the use of AATCP-1(B) more of a global standard. The USAF has ratified STANAG 3759 and AS 90/07, and has identified AFI 11-230 as its implementing document.

NOTE: The use of the term 'PANS-OPS' within this chapter refers only to Volume II of ICAO Doc 8168-OPS/611, fourth edition – 1993, amendments 1-10.

A9.2. Implementation. The USAF will implement ICAO criteria on a staged basis at locations outside the contiguous United States and its territories. 'USAF International TERPS Criteria', as established in this document, will be used in conjunction with PANS-OPS and AATCP-1(B) to establish a single USAF international standard.

NOTE: Although AATCP-1(B) is a NATO document, its use is a conduit to establish an international USAF standard. USAF International TERPS Criteria, which includes the use of a AATCP-1(B), will be used for review of FTIP and in the development of instrument approach and departure procedures at locations where it is deemed necessary by MAJCOMs to apply ICAO standards.

A9.2.1. Criteria. Except as supplemented by this attachment, use PANS-OPS in conjunction with AATCP-1(B) for FTIP reviews, review and publication of host nation FTIP and the design of instrument procedures at locations outside the US where the USAF has responsibility. Unless otherwise specified in this chapter, mixing criteria standards, USAF TERPS and USAF International TERPS, is not authorized.

A9.2.1.1. Deviations to Criteria. When a waiver is required due to criteria deviations, specify in the waiver package the applicable document and paragraph to be waived. For example: PANS-OPS, Volume II, Part III, paragraph 5.6, or AATCP-1(B), paragraph 414.d.1, etc.

A9.2.1.2. When a specific requirement exists for a type of instrument procedure that is not addressed in this attachment, AATCP-1(B) or PANS-OPS, use USAF TERPS standards.

NOTE: Amendments to PANS-OPS and future versions of AATCP-1 will be implemented via AFI 11-230 as automation evolves.

A9.2.2. Training. USAF TERPS specialist shall be formally trained in ICAO standards prior to reviewing or designing instrument procedures IAW USAF International TERPS standards (see **Chapter 12**).

A9.2.3. Application. MAJCOMs will be responsible for determining when they, and their supported units, will implement the USAF International TERPS standard. Application should include all procedures at a single location. Consideration of the following should be taken when determining which USAF standard to apply:

A9.2.3.1. Is the host nation standard ICAO, or some variation consistent with the ICAO philosophy?

A9.2.3.2. Has the USAF TERPS specialist responsible for the location been formally trained in ICAO standards?

A9.2.3.3. Does GPD support the type of procedure(s) to be reviewed/designed?

A9.2.4. Use of Automation. The USAF GPD automation program should be used to the maximum extent possible when reviewing and designing instrument procedures IAW USAF International TERPS Criteria. Select the 'NATO' criteria button when a procedure is to be reviewed or designed IAW USAF International TERPS criteria.

A9.2.4.1. Use of GPD is mandatory for reviewing or designing precision final approach segments IAW USAF International TERPS criteria.

A9.2.4.2. Except for precision final segments, when GPD does not support a particular segment type or procedure to be reviewed/designed manual methods may be applied.

A9.2.4.3. For situations where GPD does not support the type of segment or procedure to be reviewed/designed, and when explicit guidance is not provided in PANS-OPS, MAJCOMs may consider deferring their implementation of the USAF International TERPS standards until GPD supports such requirements.

NOTE 1: GPD incorporates international criteria using standard units (SI) of measurement (meters, kilometers and gradients expressed in percentages) and allows input/output to be expressed in equivalent non-SI units (feet, nautical miles and gradients expressed in feet per nautical mile). This sometimes results in erroneous violations to criteria. When erroneous violations are encountered, such as "Initial descent gradient (1000 ft/nm) is greater than the maximum of 16.4%", document the discrepancy in the 'Justification' dialog box. A waiver is not required when a violation is generated due to the use of non-SI units.

NOTE 2: For those sections within PANS-OPS that are expressed in implicit terms, HQ AFFSA/XOIP has provided the GPD software developer with explicit explanations of criteria in order to achieve a single standard USAF-wide.

A9.2.5. The USAF will implement in the following manner:

A9.2.5.1. Phase I. HQ USAFE will evaluate/re-design the instrument procedures at Ramstein (ETAR) and Spangdahlem (ETAD) Air Bases in Germany.

A9.2.5.2. Phase II. MAJCOMs with FTIP responsibilities will systematically transition to the USAF International TERPS standard.

A9.2.5.3. Phase III. All MAJCOMs with instrument procedure design and review responsibility at locations outside the contiguous United States and its territories (to include USAF bases) where the host nation uses ICAO (or a variation) will transition to the USAF International TERPS standard.

A9.2.6. MAJCOMs shall notify AFFSA/XOIP of their intent to implement each applicable phase listed above.

A9.2.7. During the transition period, MAJCOMs can be selective in their application of USAF International TERPS criteria. Ensure that procedure packages, the **Attachment 7** checklist, and FTIP review letters clearly identify which standard is applied.

A9.3. Use of AATCP-1. Except as stated in this attachment, use AATCP-1(B) in conjunction with PANS-OPS at locations where USAF International TERPS standards apply.

A9.3.1. Chapter 1, *Administrative*. Except for Section 1, use for informational purposes only. Specific USAF administrative guidance is contained in AFMAN 11-226 and in various chapters of AFI 11-230.

A9.3.2. Chapter 2, *Supplemented PANS-OPS Criteria*.

A9.3.2.1. Paragraphs 201 through 213 and paragraph 260 are not applicable. The USAF has yet to establish requirements for helicopter procedures IAW ICAO standards.

A9.3.2.2. Paragraph 238. Not applicable. Also see paragraph **A9.3.5.**. For PAR final and missed approach segments, use USAF TERPS criteria. For the remaining segments associated with PAR procedures, use PANS-OPS and AATCP-1(B).

A9.3.3. Chapter 3, *Additional Military Criteria – General*.

A9.3.3.1. Paragraph 311.a, *Descent Gradient*. USAF GPD calculates descent gradients in percentages, which results in a violation when a descent gradient greater than 996 ft/NM is entered. Disregard the violation if the descent gradient is less than or equal to 1000 ft/NM.

A9.3.3.2. Paragraph 313. Not applicable. Use USAF TERPS criteria for visual portion of final and Visual Descent Point (VDP).

A9.3.4. Chapter 4, *Additional Military Criteria – Takeoff and Landing Minima*.

A9.3.4.1. When a stepdown fix is included in the final segment, minimums with, and without the stepdown fix shall be provided.

A9.3.4.2. Paragraph 418, *Emergency Safe Altitude*. In addition, the ESA center point for an RNAV approach shall be the ARP.

A9.3.5. Chapter 6, *Additional Military Criteria – Precision Approach Radar (PAR)*. Not applicable. For PAR final and missed approach segments, use USAF TERPS criteria. For the remaining segments associated with PAR procedures, use PANS-OPS and AATCP-1(B).

A9.3.6. Chapter 8, *Additional Military Criteria - Helicopters*. Not applicable. The USAF has yet to establish requirements for helicopter procedures IAW ICAO standards.

A9.4. Use of PANS-OPS. Except as stated in this chapter, use AATCP-1(B) in conjunction with PANS-OPS at locations where USAF International TERPS standards apply.

A9.4.1. Part II, *Procedure Construction and Obstacle Clearance Criteria for Departure Procedures*.

A9.4.1.1. Currently, GPD is only capable of evaluating omnidirectional departures, with options to adjust the Procedure Design Gradient (PDG) and turn altitude.

A9.4.1.2. Chapter 2, paragraph 2.4.1., *Obstacle Identification Surface (OIS)*. The origin of the OIS begins at a height equivalent to the DER elevation. The origin height may be raised as high as 16 feet to eliminate penetrations to the OIS. Establishing the origin height at an altitude greater than 16 feet requires a waiver. When the origin height is raised above 0, publish a DER crossing height on the procedure.

A9.4.1.3. Chapter 3, paragraph 3.2.3, *Obstacle Identification Surface*. See paragraph **A9.4.1.2.** above.

A9.4.1.4. Chapter 4, paragraph 4.3.1, *Area 1 OIS*. See paragraph **A9.4.1.2.** above.

A9.4.2. Part III, *Procedure Construction and Obstacle Clearance Criteria for Instrument Approach Procedures*.

A9.4.2.1. Chapter 1, paragraph 1.9.2. When converting IAS to TAS, use the formula specified in Attachment F to Part III, Table III-F-1 or Table III-F-2.

A9.4.2.2. Chapter 1, paragraph 1.13, *Increased Altitudes/Heights for Mountainous Terrain*. In addition, add 600 meters (or 1000 feet) to holding, MSA and ESA segments.

A9.4.2.3. Chapter 2, paragraph 2.6.2.1. VOR accuracies also apply to TACAN facilities.

A9.4.2.4. Chapter 3, *Arrival Segment*. Not applicable.

A9.4.2.5. Chapter 4, paragraph 4.3.3.1, *Area associated with dead reckoning*. GPD does not support the development of dead reckoning initial segments. Manual application of this paragraph is authorized.

A9.4.2.6. Chapter 4, paragraph 4.3.5, *Descent Gradient*. USAF GPD calculates descent gradients in percentages, which results in a violation when a descent gradient greater than 486 ft/NM is entered. Disregard the violation if the descent gradient is less than or equal to 500 ft/NM. For high altitude procedures, see AATCP-1(B), paragraph 311.a, and paragraph **A9.3.3.1.**.

A9.4.2.7. Chapter 5, paragraph 5.6, *Descent Gradient*. In order to correctly apply the 1.5 NM flat segment using GPD, a pseudo stepdown fix must be used.

A9.4.2.8. Chapter 6, paragraph 6.4.6.c, *Remote Altimeter Setting*. Not Applicable. Use AATCP-1(B), paragraph 233.

A9.4.2.9. Chapter 24, paragraph 24.1, *Precision Approach Radar (PAR)*. Not Applicable. Use USAF TERPS criteria for the final and missed approach segments. Also see paragraph **A9.3.2.2.**, paragraph **A9.3.5.** and AATCP-1(B), paragraph 238.

A9.4.2.10. Chapter 26, *VOR With Final Approach Fix (FAF)*. This chapter also applies to TACAN procedures. See AATCP-1(B), Chapter 5.

A9.4.2.11. Chapter 30, *MLS*. Not applicable. Use USAF TERPS criteria.

A9.4.3. Part V. Not applicable.

A9.4.4. Part VI. Not applicable.

A9.5. Criteria in addition to AATCP-1(B) and PANS-OPS.

A9.5.1. For manual applications, document other than nominal climb gradients associated with departures and missed approach segments in both percentages and feet per nautical mile. The same applies for non-standard descent gradients.

A9.5.2. Unless otherwise stated in PANS-OPS, the rise in secondary obstacle clearance surfaces is measured perpendicular to the nominal flight track.

A9.5.3. For construction of Category II/III procedures, manually enter obstacles into the appropriate database that represents aircraft taxiing, in holding bays, or taxiway holding positions.

A9.5.4. PANS-OPS Amendments 11 & 12 may be used when the amendment only adds explicit guidance to the current criteria.